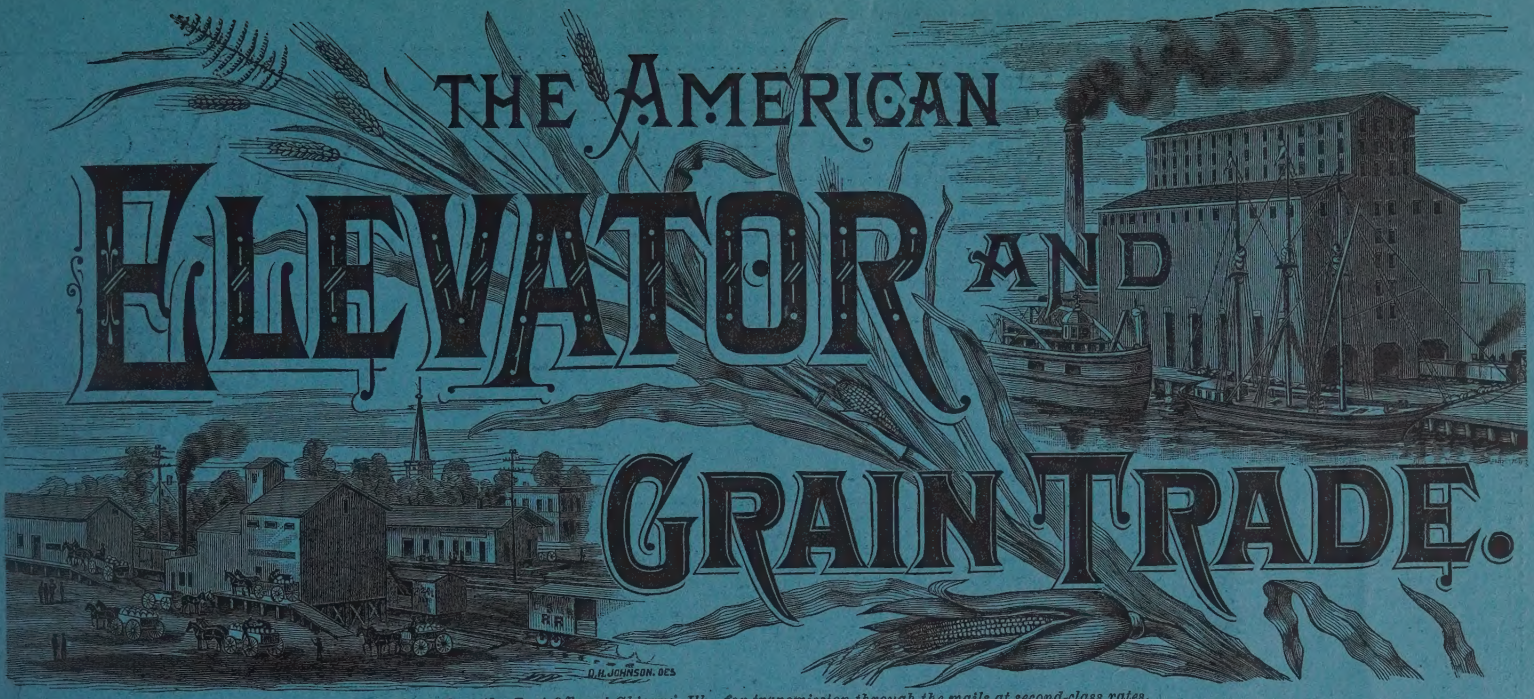

THE AMERICAN ELEVATOR AND GRAIN TRADE.

Entered at the Post Office at Chicago, Ill., for transmission through the mails at second-class rates.

A MONTHLY JOURNAL DEVOTED TO THE ELEVATOR AND GRAIN INTERESTS.

PUBLISHED BY Mitchell Bros. Company, (INCORPORATED.) | VOL. I. | CHICAGO, ILLINOIS, OCTOBER 15, 1882. | No. 4. | SUBSCRIPTION PRICE, ONE DOLLAR PER ANNUM.

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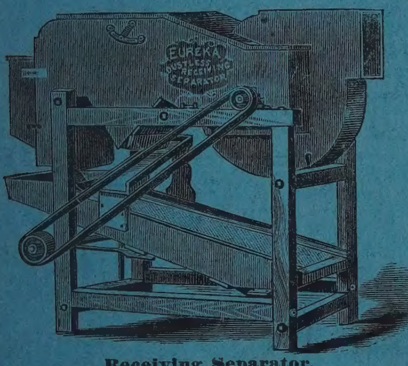

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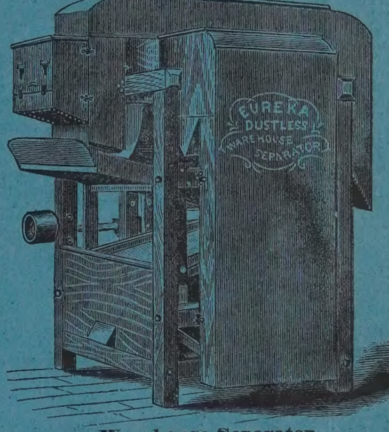

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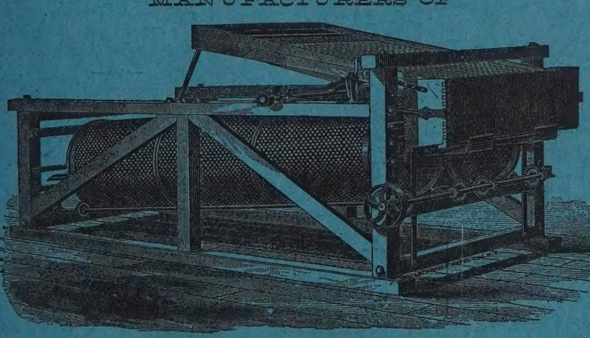

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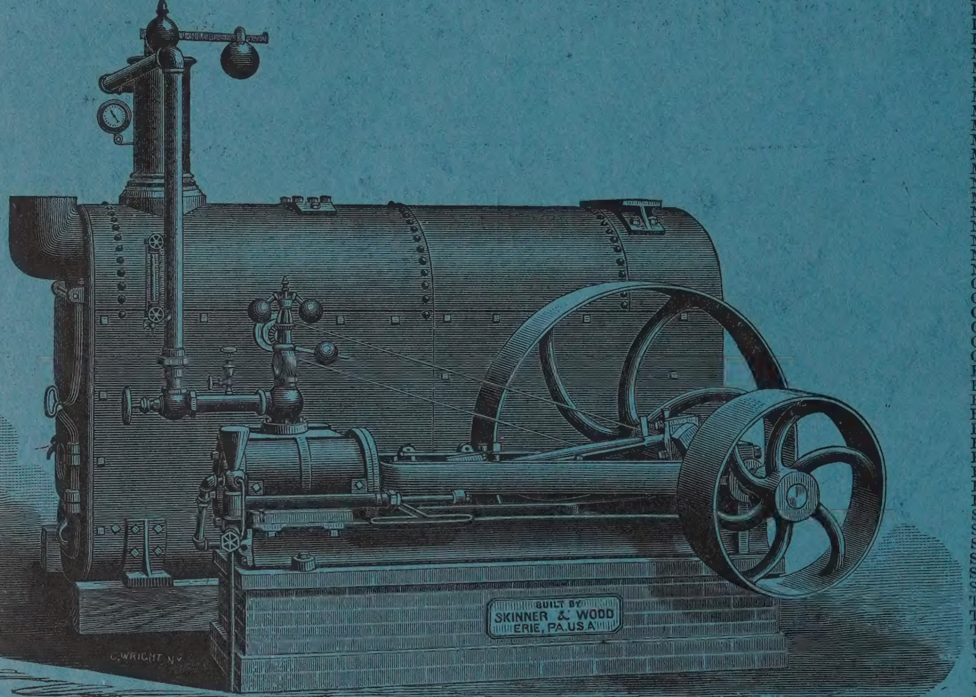
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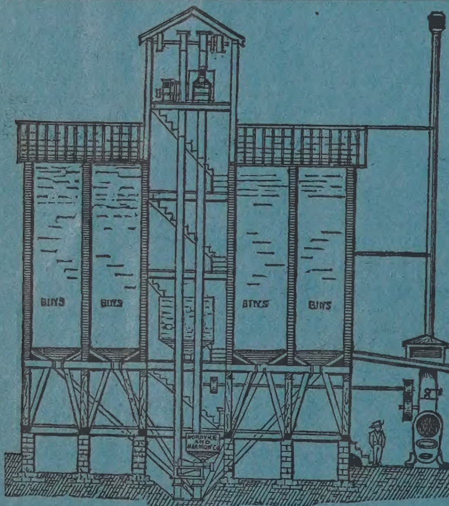

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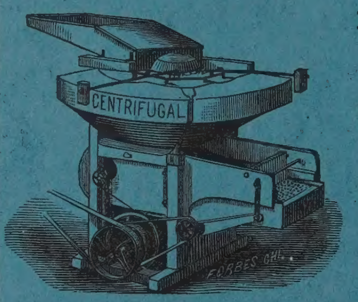

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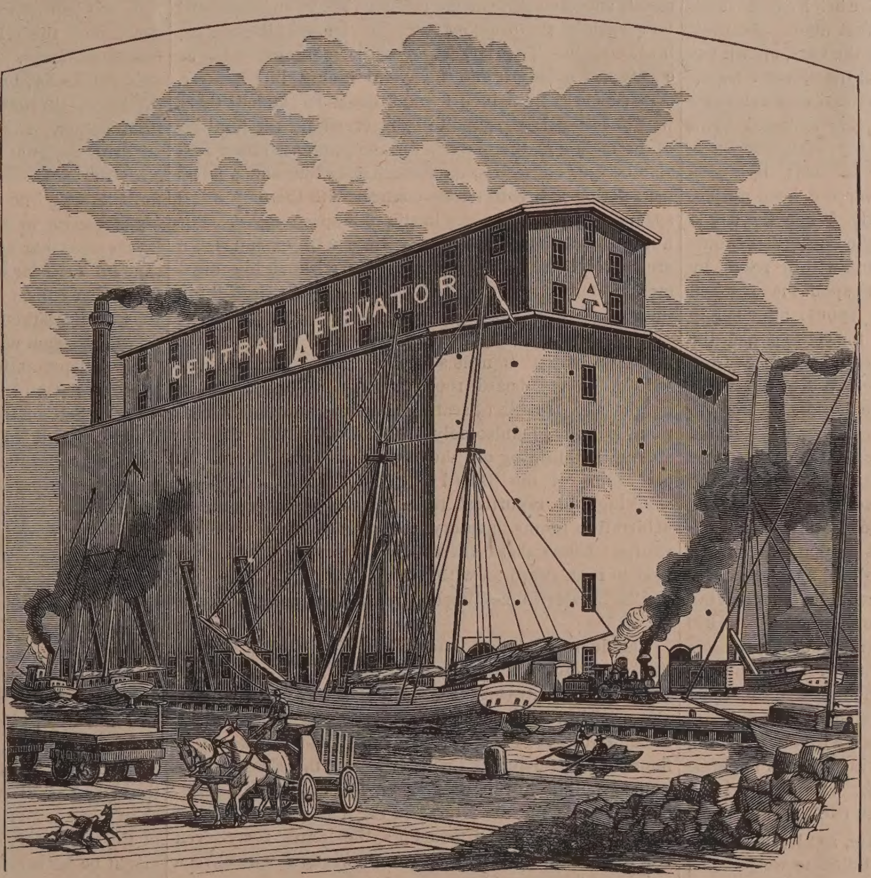
CENTRAL ELEVATOR "A," CHICAGO, ILL.

In the preceding number of this journal we gave an illustration of the Chicago, Burlington and Quincy Elevator "C," owned by Messrs. Armour, Dole & Co. In pursuance of our plan as then stated, we present to the readers of the ELEVATOR AND GRAIN TRADE an illustrated description of Central Elevator "A," located in this city, at the terminus of the Illinois Central Railroad, and on a slip of water connected with the Chicago River where it empties into Lake Michigan. It is operated by Messrs. J. & E. Buckingham, of this city, who also operate Central Elevator "B," a somewhat larger structure, situated a few hundred feet to the east of the former. The accompanying engraving presents a perspective view of the building and its convenient relations to transportation by water and railway.



CENTRAL ELEVATOR "A," CHICAGO, ILL.

The whole building, with the additions, comprising belt houses, engine and boiler house, and chimney, rest upon a pile foundation made of heavy piles. In some cases, where there is a good, sharp, sandy bottom, foundations are employed consisting of a timber platform made of two thicknesses of timber laid transversely to each other. Piling, however, is by far the more common method; and as stated, forms the primary foundation of the building under consideration. The piles are all of hard wood and are driven at an average distance of eighteen inches from centres in all directions under all the piers and supporting walls. Excavation having previously been made below the frost line, the piles are all cut off evenly at one level on top, and the foundation masonry commences immediately from that level. The masonry is of large block stone, laid in courses, and consists of a continuous wall surrounding the building, averaging four feet in thickness; while within the inclosed space are piers averaging eight feet in length and of the same thickness as the outer wall. These piers are in rows across the building, the rows being spaced at intervals of ten feet lengthwise the building. All this masonry is brought up to the level of the railroad tracks. Under each set of posts supporting the building are dimension stones, all placed at one level on top which is about two feet above the track level. The supporting posts rest upon these stones and carry the weight of the building above. They are all 12x12 pine timber, single posts being used around the outside wall, and clusters of two and three on the piers, and on the longitudinal and transverse section of the building. The supporting posts are then capped by double 12x12 oak timbers, running transversely to the building and forming bents. These are further capped by 12x12 oak timbers running longitudinally on the transverse and longitudinal sections of the building.

On this timber work the bins are commenced. The bin work is composed of planks two inches thick, six inches wide, laid one on the other, and all firmly spiked as the work progresses, the partitions forming the storage bins resting each upon one of the oak caps. The bins are mostly 10x11 is size, and this plank work being carried to a height of fifty-two feet, makes the storage capacity of each bin about 4,000 bushels. Inclined bottoms are built in the bins, for the obvious purpose that the grain may be drawn off without shoveling. On the top of the bins in the longitudinal section of the building, the framework of the cupalo commences. The cupalo of the elevator is where all the weighing is done and the distribution of grain to the bins is made. Here also is located the machinery for driving the shipping and receiving elevators. The framework is of pine 10x10, framed securely in the usual way. The roof and sides of the cupalo are covered with sheet tin, painted. The body of the building below the roof is inclosed by brick walls extending from the foundation on the transverse section, within which are walls of plank, two by eight, laid one upon the other. These plank walls begin about sixteen feet from the top of the piers. The engine and boiler house and smoke stack are also of brick. The dimensions of the superstructure are as follows: Width from outside to outside of posts at the base, 98 feet; length from outside to outside of posts at the base, 250 feet; width of cupalo, 48 feet; height from masonry to bottom of bins, 15 feet 10 inches; height from bottom of bins to top of bins, 52 feet; height from top of bins or bin floor to under side of spout floor, 17 feet 10 inches; height from spout floor to under side of scale floor, 12 feet; height from under side of scale floor to under side of shaft floor, 16 feet; height from under side of shaft floor to ridgepole, 12 feet; making a total height from masonry to the ridgepole of 125 feet 8 inches.

The building is divided into 200 grain bins, six of which are set apart for shipping through, from which spouts deliver grain directly into vessels. Three of the 200 bins are divided into four bins each by cross partitions, and are used for grain designed to be delivered to wagons. A scale and a hopper are attached below each of these bins for weighing out each load. Access is obtained to the bins by means of an iron ladder in the corner of each bin. The total storage capacity of the elevator, in the bins proper, is about 800,000 bushels, though it is able to receive 1,000,000 bushels by using the first story.

We will now consider the internal arrangements of the elevator for receiving and shipping grain. There are eight elevator legs, spaced the length of a car apart in a line between the two railroad tracks. These are called receiving elevators because their principal use is to receive and elevate grain from the incoming cars. About the centre of the building is a line of elevator legs spaced 40 feet apart, numbering six in all, which are called shipping elevators, their principal use being to elevate grain for shipping out. In the cupalo in front of each receiving elevator is a scale with hopper attached, capable of weighing a carload at a draught. In front of each shipping elevator is a hopper called a garner, for the purpose of holding the grain accumulated by the elevator during the process of taking the weight of a draught. Below the garner is the hopper scale on which the grain is weighed out to the vessel or car. The elevator legs are all built within wooden cases inclosing four-ply rubber belts, on which the iron buckets, each 20 inches long, are bolted. These elevators have a capacity of 5,000 bushels per hour. They are driven at the head by contact of the head pulley with a friction pulley built of iron and paper, on the line shaft. The whole is so arranged that by the application of a few pounds weight to a lever, each leg may be stopped in its motion instantly if so desired, or when at rest may be instantly started without breakage of jar. The receiving elevators are all driven from the line shaft, which averages five inches in diameter, and the counter shaft driving the shipping elevators averages four inches diameter. All the shafting is connected with adjusting coupling and oscillating pillow blocks. The main belt, driving all the machinery of the building, is of six-ply rubber and 45 inches wide. This belt transmits the power of a 250 horse-power upright low-pressure engine. Steam is supplied by two horizontal-flue boilers, each 20 feet long and 66 inches in diameter. The brick smoke stack is circular in form and extends two feet above the peak of the roof. In receiving grain from the cars, after it has been deposited in the pit in front of the elevator leg by means of the steam shovels, it is admitted to the elevator by the feed being controlled by a slide actuated by a lever. When the grain reaches the top of the elevator by means of the buckets attached to the belt, it is discharged from the belt as it passes over the head pulley, into the hopper on the weighing scale. When the whole carload has been received, it is weighed and then spouted into any one of various storage bins within reach by means of spouts. Any particular spout is reached through the agency of a revolving spout attached to the hopper, which connects with the bin spouts, the openings to which are arranged at equal distances from the hopper, thereby forming a circle. When the grain is to be shipped it is drawn from the bottom of the bin by means of spouts, into the shipping elevators, elevated by them and thrown into the garners, thence into the weighing hoppers where each draught is weighed and recorded. The grain is then spouted into the shipping bins, from which it is drawn into the vessel's or steamer's hold by means of long spouts supported by the ship's rigging. The supply is regulated by means of a slide and lever. Elevator "A" is capable of receiving and unloading 320 cars in ten hours, or about 125,000 bushels, and is able to ship a similar amount to vessels in the same length of time. The usual force employed in a grain elevator outside of the office work, is a superintendent, track foreman, dock foreman, engineer, fireman, oiler, millwright, two weighmen each with one assistant, watchman, and such common laboring help as is necessary to man the cars, which, with the steam shovel machinery, amounts to two men to each car.

The proprietors of this elevator are, as already stated, Messrs. J. & E. Buckingham. The building was erected in 1872 under the personal supervision of J. T. Moulton & Son, of Chicago, to whose study and experience are due many of the improvements now used in the construction of elevators.

It is reported that the wheat crop of the British Isles will probably be one of 10,000,000 quarters, or 80,000,000 bushels, leaving 14,000,000 quarters, or 112,000,000 bushels, to be supplied from foreign sources. The crop, though the best in seven years, is not half large enough to supply the home want.

THE NEW BOARD OF TRADE BUILDING AT CHICAGO.

Among the palatial structures of our city, whose progress will be watched with intense interest by our citizens, is the building now in process of erection for the chamber of commerce, fronting on Jackson and extending back to Van Buren Streets, between Sherman Street and Pacific Avenue. The site, to be entirely occupied by the building, will have a frontage of 175 feet and be 225 feet in depth. The plans furnished by Mr. W. W. Boyden, of Chicago, who is the superintending architect, are in modern Gothic style, with Fox Island granite for material, and the estimate cost is $1,500,000. The foundations, already completed, are seven feet thick, a solid mass of cement and timbers, on which are to be placed the immense stone-cut piers, upon which the super-structure is to rest. The ventilating and steam-heating apparatus will occupy the sub-basement. Great attention has been paid to the matter of ventilation, for which two large fans are to be used in the basement, supplemented by one in an upper story to aid if required in the expulsion of foul air. A series of ventilating ducts are to be arranged radiating from the grain pits in the centre of the halls and outside walls, all leading to a main shaft. The ground story, divided into eighteen large and convenient rooms for offices and banking, each room provided with fire-proof vaults, will be one step above the sidewalk.

The main hall 152x161 feet inside measurement, will be eighteen feet above the level of the sidewalk. The floors of this hall, as also of the various offices, will consist of hard white maple, finished with various hard woods, as maple, cherry, ash and butternut. The outside walls will be surrounded with large columns between the windows, all of which will be used for purposes of support to the upper stories. The finished bases of these columns will be of marble, and all the wainscoating of the main hall will be of the same material, and the shafts of the columns above the base will be scagliola fire-proofing with a rich cornice, arches, brackets, etc. The largest of these columns will be eighty feet in length and forty-two inches in diameter, constructed of three-inch wrought-iron. In the hall there will be two galleries, one to be reserved for the families of the members, the other is for the public. There will also be four corner rooms for consultation, and a number of telegraph counters to connect with the ample and spacious operating rooms in the roof space above. The huge broad panels of the ceiling will extend to an arched skylight, 70x35 feet, filled in with richly ornamented stained glass. There will be another skylight in the roof of equal size.

Above the ground floor in the office portion of the building, which is nine stories in height, on one side will be the call-board room, occupying two stories in height, and capable of seating about 600 persons. This room is to be handsomely finished. On the opposite side of the building on the same level will be the official rooms of the Board of Trade, clerks', reception, smoking and reporters' rooms, Board of Directors and arbitration rooms, lavatory, cloak rooms and fire-proof vaults. Above these there will be seventy suits of offices to rent, supplied with every convenience, fire-proof vaults, lavatories, heating and ventilating arrangements, etc.

The floors of the ground and second stories will be tiled with either marble or otherwise. Fire proof arches will be fitted between the iron floor beams; iron will be also used in the construction of the roof. No wood is to be used in the construction of the building except in floor surfaces, doors and windows. All the glass is to be polished plate in the regular windows with cathedral-colored transoms, and those of the main side and front will be of very large dimensions, the largest forty-seven feet high, while the center tower window will have a height of fifty-seven feet.

The external ornamentation will be on a grand scale with small details studiously avoided except as needed to relieve the monotony. The Jackson Street front has seven parts, two corner pavillions, two receding bays, then the centre of the building each side of the grand tower, which last is to be thirty-two feet front and three hundred feet high. The masonry will extend up 225 feet and the remainder will be iron. At the height of 220 feet there will be a clock dial on each of the four sides of the tower, twelve feet in diameter, and about ten feet above a lookout balcony around the tower. All the external entrances will have large prominent doors finished with polished red granite square columns. The main front column will be five feet in diameter and twenty feet high, surmounted with large carved capitals, brackets and a balcony on each side of which there will be two colossal lions carved in stone. The side entrances are similar but smaller and less expensive. Four large elevators will be in use to convey passengers to any part of the building; the main hall, however, can be reached by four large stairways from the front or the side streets. The building is promised to be completed by May, 1883. There is to be erected on the same block with the above, at a cost of $1,000,000, a nine or ten story office building by gentlemen connected with the Board of Trade.

BELTING FROM AN INSURANCE VIEW.

How long will a belt wear? is almost synonymous in its indefiniteness with the query, How large is a piece of chalk? There are so many "conditions, limitations and requirements," to keep within insurance language, entering into the solution of the question that a mere knowledge of one or two will hardly produce a satisfactory result. Among the valuable elements entering into belt depreciation may be mentioned its length, width and thickness, strain, friction or power to transmit tension, proper adjustment and temperature. If the belt is of leather and oak-tanned it will last one-third longer than if chemical-tanned. The manner in which belting is laced or joined together makes a great a difference in the wear. Having each end of the pieces to be joined cut off true and square, and not laced too tightly, and the wear of the belt may be decreased two per cent. per year. Some of the methods used to prevent a belt slipping on the pulley are detrimental to its wear, among which may be mentioned powdered resin or pitch, which soon penetrates the leather and rots the belt. Roughing the surface by filing is another source of wear. Running the belt on too tight a pulley will generate heat, decompose the oil and organic matter in the belt, and hasten its decay. A belt of unequal thickness will not only run badly, but wear much faster than one of equal thickness throughout. Rubber belts depreciate faster than leather. Frequently a few minutes of quick motion will roll the gum off in such quantities as to entirely destroy the belt. During freezing weather, if moisture finds its way into the seams or between the different layers of canvas in rubber belts, and becomes frozen, the layers soon tear apart and the belt is ruined. Again, if they are used for cross belts, shifting belts on cone pulleys, or any place where they are liable to slip, friction soon destroys them. Using leather belts in damp places, or where steam comes in contact with them, materially hastens depreciation. As an illustration of the variation of depreciation in belting, we may mention the large driving belt of a threshing machine, which will only wear a couple of years, and then compare it with the 36-inch driving belt of the Dayton Car Works, which has run continually for ten years, and is virtually as good to-day as when first started. Short driving belts depreciate more rapidly than any other, and need to be replaced every ten or twelve months. Generally an 8 to 16-inch belt will wear from six to eight years. Taking all the facts into consideration, and the entire amount of belting used, a fair depreciation would be: Flouring mills 10 per cent., iron workers 12½ per cent., and wood workers 20 per cent. Belts in contact with steam or moisture will depreciate 10 per cent faster than when run in a dry place. The cost of belting may be had from the dealer's catalogue—from the prices of which there is a discount of from 40 to 50 per cent., and sometimes a small discount off that for tax. The belting of a shop is a good criterion by which to judge of the value of the machinery of a shop. A person not a machinist might be bothered to tell whether the machinery of a shop was in good condition or whether the business was profitable. These doubts can be materially lessened by a glance at the belting. If the general make-up is bad, if the belts are all patched, frayed out or badly doubled at the edges, and have a sort of thrown-together look, or if there is a deal of wobbling on the pulleys, and a sort of general shabbiness throughout, it can be safely set down that the concern is hard up, or the machinery is badly worn, or that there is a scarcity of work; and in all and singular this little index pretty surely points to the fact that your particular company don't want that risk.

NEW WORKS OF CHARLES KAESTNER & CO., CHICAGO, ILL.

The accompanying illustration presents a view of the machine shops of Messrs. Charles Kaestner & Co., recently erected in this city at Nos. 303 to 309 South Canal Street. This enterprising and well-known firm of mill furnishers was first established in 1863, at No. 63 of the same street, where they have remained until the present building was erected. Their business had rapidly increased, and had become so extensive that after possessing themselves of all available rooms, lofts and basements in their vicinity, they were still in need of room. Their present buildings have about 50,000 square feet of working room, and are admirably lighted on all sides. They have also large storage sheds and yards adjacent, furnishing ample facilities for their operations. In addition to the articles supplied by mill-furnishing houses in general, Messrs. Kaestner & Co. make the Kaestner Patent Portable Mill, which is their own specialty, and is in great demand both at home and abroad, more than 4,000 of them being now in operation, while the books of the firm are crowded with orders. The new plant includes almost everything that the mechanical genius of our time has produced to facilitate and expedite work, enabling the house to rapidly fill orders with machinery remarkable for accuracy and finish, and at moderate prices. The firm has devoted special care in preparing to meet the increasing demand for elevator machinery, and are now ready to take contracts for elevators in running order. Mr. Kaestner, who is a practical mechanic of long experience, superintends personally the whole work in the shops, which is a guarantee of its excellence. The office, with its correspondence and details of business, is in charge of Mr. Frank Hecht.

Messrs. Kaestner & Co. are among the oldest and best known manufacturers in their special line in the whole West, and it it by a strict attention to the wants of their customers that they find themselves enjoying their present large trade and their fine new quarters. As noted before, elevator machinery is among their specialties, and they are confident of their ability to meet any requirements in this direction. They invite grain men either to call upon them or make known their wants by correspondence, which will receive prompt attention.

ESTABLISHED 1863.
PORTABLE MILLS
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GENERAL MACHINERY
SHAFTING, PULLEYS, HANGERS, GEARING.

NEW WORKS OF CHARLES KAESTNER & CO., CHICAGO, ILL.

HISTORY OF WHEAT.

Our historical knowledge of wheat is more complete than that of any other grain for the reason that wheat has been more largely used for human food than any other cereal, although historians assure us that barley was used by mankind in the infancy of the world, long before wheat was cultivated for its fruit. The varieties of wheat, says a cotemporary, are almost numberless, and their characters vary widely under the influence of cultivation and climate. There are said to be 180 distinct varieties in the museum of Cornell University. On the slopes of the mountains of Mexico and Xalapa the luxuriance of vegetation is such that wheat does not form ears. In Japan, it is said, the wheat has been so developed by Japanese farmers, that, no matter how much manure is used, the straw will not grow larger, though the length of the ear will increase. The height is rarely more than two feet, and often not more than twenty inches. Through selection, winter wheat has been changed to summer wheat in three years, and summer wheat converted in the same time to winter wheat. In general, wheat is the most esteemed of the cereal productions, but in Abyssinia, according to Parkyns, the flour ot the "teff" or "dogussa," scarcely palatable to Europeans, is preferred by the natives to any other grain.

Isis was supposed to have introduced wheat into Egypt, Demeter into Greece, and the Emperor Chin-Wong into China, about 3000 B. C. In Europe it was cultivated before the period of history, as samples have been recovered from the lacustrine dwellings of Switzerland. In England it was probably not cultivated by the ancient Britons, but the Anglo-Saxons when Bede wrote early in the eighth century, sowed their wheat in the spring, and in the days of Queen Elizabeth its cultivation was but partial Indeed, wheat was an article of comparative luxury till nearly the seventh century. In India wheat seems not to be native, but introduced, for its Sanscrit name signifies 'food of the barbarian;" yet three varieties are mentioned in the Bhavaprakasa, one of which, a large grained, is said to have come from the West, and another, a small grained or beardless wheat, is said to have been indigenous to Middle India.

The foundation of the wheat harvest of Mexico is said, to have been three or four grains carefully cultivated in 1530, and preserved by a slave of Cortez. The first crop of Quito was raised by a Franciscan monk in front of the convent. Garcilasso de la Vega affirms that in Peru up to 1547, wheaten bread had not been sold in Cuzco Wheat was first sown by Gosnold on Cuttyhunk, one of the Elizabeth islands in Buzzard's Bay, off Massachusetts, in 1602, when he explored the coast. In 1604, on island of St. Croix, near Calais, Me., the Sieur de Monts had some wheat sown which flourished finely. In 1611 the first wheat appears to have been sown in Virginia. In 1626 samples of wheat grown in the Dutch colony at New Netherlands were shown in Holland. It is probable that wheat was sown in the Plymouth colony prior to 1629, though we find no record of it, and in 1629 wheat was ordered from England as seed. In 1718 wheat was introduced into the valley of the Mississippi by the "Western Company." In 1799 it was among the cultivated crops of the Simos Indians of the Gila river, New Mexico.

CORN SMUT.

At this season of the year every farmer takes more or less interest in the curious growths so often found on the ears of Indian corn, and to which the name of corn smut has very generally been given in this country. As commonly found it consists of soft rounded or pointed outgrowth, whitish externally, and black and powdery within. These appear for the most part upon the ears, but occasionally upon the tassels and leaves. Where they occur upon the ears each outgrowth springs from the place upon the cob which should have been occupied by a kernel; in fact, we shall see that each outgrowth is a kind of transformed kernel. This disease is due to the growth of an internal parasitic plant in the tissues of the corn. It has been carefully studied by many botanists, and its vegetable nature has long been known, as well as much of its structure and life history. In common with many other parasites the smut plant has a very simple structure. Instead of being composed of leaves, stems, roots, flowers, etc., it is no more than an aggregation of simple cells, arranged more or less in rows or threads. These threads constitute the whole plant body, there being nothing to correspond to the organs of the higher plants. One would look in vain to find, for example, anything to answer to the leaves or the roots of common plants. Furthermore, the smut plant differs strikingly from ordinary vegetation, in being entirely destitute of green color. But the vegetable physiologists are agreed that this is simply correlated with the parasitic habit, it being a well known fact that all true parasites are pale in color, or at any rate not green. A plant which is green, that is, which contains the pigment chlorophyll, is capable of getting a most important part of its food, its carbon, from the air, or rather from the carbonic acid in the air, but a parasite gets its carbon, as well as the rest of its food, from some other plant, by direct stealing, hence it has no need of chlorophyll.

Where now in the vegetable kingdom shall we put this simple thread-like parasite? Certainly we must carry it down beyond the lowermost flowering plants; the ferns and the mosses are also far too highly organized to permit of any but the most general and distant relationship. Go down further into the great domain in which puffballs, toadstools and mushrooms are found, and here for the first time we find somewhat of relationship. True, the smut plant is much simpler in structure than even the toadstool, but with all its simplicity it is manifestly a blood relation, rather badly degenerated by its excessive parasitism. We would in scientific language express this relationship by referring the smut plant to the genus *Ustilago*, of the natural *Ustilagineæ*, which in turn belongs to the grand division *Carposporeæ*. The species was long ago designated as *Ustilago maydis*, the smut of Indian corn. Fischer van Waldheim, an eminent botanist of Warsaw, Russia, has detected the threads of the smut plant in the stem of corn down almost to the root, and extending far out into the leaves. They are always more abundant in the richer parts of the corn plant and hence in the young kernels they abound, as may be seen by making thin slices of the earliest stages of the smut as it appears in the ears of corn. In these rich parts of the affected plant the ends of the parasitic threads swell up somewhat, and from their protoplasmic contents form small round spores, which are at first smooth and light-colored, but later roughened externally and of a deep brown or black color. These spores are set free by the softening (deliquescing) of the now mature smut-threads; this is the soft and watery stage of the disease. After this stage the water evaporates, leaving little more than the mass of dark spores, which are now ready to be blown away by the lightest breath of wind. These spores are the reproductive bodies of the smut plant, and while structurally they are much simpler than seeds, they still perform the general function of seeds, that is, they sooner or later give rise to new smut.

The most careful experiments yet made fail to show the precise method by which the germinating spore sends its threads into the corn; probably there are one or more intervening stages between the spore and the appearance of the disease in the corn, as there are in the case of the rusts, which are to be regarded as quite close relatives of the smuts. But if we do not yet know the complete life-history, we know certainly that the spores in some way reproduce smut, and that the greater the number of spores the greater will be the amount of the smut. It is a matter of common observation that in general the smutted ears increase year by year in a field which is planted successively with corn. On the grounds of the Iowa Agricultural College several years ago a plat of three-fourths of an acre, planted with sweet corn, was observed to have a few smutted ears; these were permitted to remain on the ground and disseminate their spores. Next year the plat was again planted with sweet corn and the number of smutted ears was observed to be greatly increased. These were again permitted to remain on the ground. The following season sweet corn was planted for the third time, and the smut in this crop was so abundant as to make it difficut to find a sound ear. The experiment was carried no further, as it had demonstrated the fact that the spores when left upon the ground are in good condition to produce smut in the next year's crop. The remedy is a simple one and consists, first, in carefully gathering and burning all smutted ears and other affected parts of the corn, and, second, in being careful not to plant seed which may have spores in contact with and adhering to the kernels.

ON THE PRESSURE OF WHEAT STORED IN ELONGATED CELLS OR BINS.

BY MR. ISAAC ROBERTS, F. G. S., F. R. A. S.

[Paper read before the British Association at Southampton, August 30, 1882.]

In America wheat is now largely stored in cells or bins measuring from 10 to 12 feet square and from 50 to 80 feet in height. They are generally built with wood partitions and fill the interior of great rectangular structures. In this country such a structure is being erected at Fleetwood, and on a small scale bins have also been erected in Liverpool. Mr. G. E. Grayson, architect of Liverpool, has designed a large structure intended for a granary. It consists of a network of hexagonal cells or bins built in brickwork, and should the scheme prove to be the economical mode of storing grain that is reasonably anticipated, such structures will in future become numerous. One great difficulty in designing buildings of the class here indicated is the absence of data by which the strength of the partitions and external walls, which form the cells, can be computed. Any data founded on the rules applicable to hydraulics will not apply, nor will rules applicable to sand or gravel apply, as the friction amongst the particles and difference in specific gravity would give inaccurate results. Hence the experiments which I will now describe have been undertaken to afford data which may indicate with more or less accuracy the pressure upon a unit of surface exerted by wheat when stored in elongated cells. I caused four cells to be made of wood and numbered respectively 1, 2, 3, and 4.

Cell No. 1 was hexagon, each side of which measured 4 inches, the inscribed circle being 7 inches in diameter. The height was 60 inches. It was supported on three legs, and the bottom consisted of a thin board about 9 inches square, resting upon a weighing machine and counterpoised so as just to touch the bottom of the cell—when placed in position. Half an ounce weight on the board would be indicated by the machine. The wheat was measured into the cell in imperial gallons and quarts one gallon weighing 7.8 pounds. The weighing machine was weighted with 56 pounds, and after the given quantity of wheat had been measured into the cell the weights were removed half a pound at a time till the machine indicated the pressure upon the movable bottom of the cell within the limit of half a pound weight. One gallon of wheat poured into the cell measured 6¼ inches in height and indicated a pressure of 5½ pounds on the bottom; two gallons 12½ inches height, pressure 7½ pounds.

From two gallons up to and including nine gallons, or from 12½ inches high in the cell to 56 inches in height, no increase in pressure beyond 7½ pounds was indicated though nine gallons of wheat, weghing 70.2 pounds were put into it. Twenty-six separate weighings were made with various quantities of wheat, from two gallons up to ten gallons, and in no instance was the minimum pressure below 6 pounds, nor the maximum above 7½ pounds. After obtaining the results above stated, I caused the cells Nos. 2, 3 and 4 to be made in order to determine if these results would be confirmed by square cells and by larger hexagonal cells.

Cell No. 2 was square, measuring 7 inches by 7 inches and 36 inches in height. The area was, therefore, equal to 49 square inches whilst the area of cell No. 1 was 41.59 square inches. Cell No. 2 was placed over the weighing machine, with a movable wood bottom counterpoised in the manner already described. Two gallons of wheat, measuring 11 inches in height, gave 8½ pounds pressure on the bottom of the cell, and when it was filled with six gallons of wheat, weighing 46.8 pounds, and measuring 33 inches in height, the pressure was still the same. With seventeen separate weighings of various quantities of wheat, from two gallons up to seven gallons, the minimum pressure in any case did not fall below 7½ pounds, nor the maximum rise above 9½ pounds; three gallons will sometimes give the maximum pressure, and six gallons will sometimes only weigh the minimum. The square cell No. 2, therefore, within narrow limits confirms the results obtained by the hexagon at cell No. 1. Cell No.3 was a hexagon measuring 6⅔ inches on each side the inscribed circle being 12 inches in diameter and the cell 60 inches in height. This cell was arranged also over the weighing machine table as described for Nos. 1 and 2. When eleven gallons of wheat, weighing 87.97 pounds, and measuring 24 inches in height, were placed in the cell the maximum pressure on the bottom was reached; any additional quantity of wheat up to 26 gallons weighing 202.8 pounds and filling the cell, did not increase the pressure on the bottom. Eighteen separate weighings were made with this cell with varying quantities of wheat between eleven gallons, and in any case the minimum pressure on the bottom was 46 pounds and the maximum 49½ pounds, the height of the wheat in the cell at 24 inches indicated these pressures. These results again confirm the accuracy of the data obtained by the cells Nos. 1 and 2. Cell No. 4 was a hexagon, the sides of which measured 12 inches each, the inscribed circle being 20.75 inches diameter and the height 96 inches. The cell was placed over the weighing machine in the manner described in cells Nos. 1, 2 and 3. Fifty-one gallons of wheat weighing 397.8 pounds and measuring 36 inches in height in the cell gave the maximum pressure of 238 pounds on the bottom, and from 51 gallons up to 131 gallons, from 35 inches up to 93½ inches height, or from 397.8 pounds up to 1,014 pounds of wheat in the cell; and the minimum pressure of 211 pounds, and the maximum pressure of 238 pounds were obtained by the respective weighing. Nineteen trials with varying quantities of wheat were made. Again the results obtained by the smaller cells Nos. 1 2 and 3 are confirmed by this large one.

I now proceed to discuss and formulate the data thus obtained, so as to make them available for practical use, first epitomizing the results obtained:

TABLE OF THE RESULTS OF THE WEIGHINGS.

No. cell.	Diameter of inscribed circle in inches.	Area of cell in inches.	Height of max. pressure in inches.	Height of cell in.	Mean pressure on bottom lbs.	Weight of wheat in cell lbs.
	20¾	374.11	36	96	224	1,014
3	12	122.8	24	60	48	202.8
2	7	49.0	11	36	8½	46.8
1	7	41.57	12½	60	7	70.0

It will be observed that all pressure upon the bottom ceases before the cells, respectively, are half filled with wheat.

That the highest point within the cell where the pressure ceases does not form the apex of a cone having the diameter of the inscribed circle as its base, is evident; but the wheat must form either a parabola or hyperbola with that base, and the whole of the weight of the wheat that may be filled into the cell, excepting only the parabola or hyperbola, is supported by friction against the sides and the friction of the individual grains against each other. They form a self-supporting dome out of a plug of wheat held in position by friction. This generalization is borne out by each of the cells, whether it be large or small. The next step will be to determine some ratio existing between the diameter of area of the cell and a portion of axis of the parabola, the product of the length of which, by the diameter or area, a will equal the cubical quantity of wheat that will represent the pressure upon the bottom. I found that 1.03 the diameter of the inscribed circle multiplied by the arc of the cell will furnish a constant that will give very satisfactory results in each of the cases we are now considering, and be applicable in general practice. The formulæ are as follows:

Let A = area of cell in square feet;
D = diameter of inscribed circle in feet;
$C = 1.03$ the constant;
W = weight of wheat in pounds of cubic feet;
P = pressure upon bottom of cell;
$\frac{P}{A}$ = pressure per square foot of area.

FORMULÆ.

$A \times D \times C \times W$ = the pressure on the bottom of the cell, and

$\frac{P}{A} = D \times C \times W$ = the pressure upon each square foot of area.

In order to test the accuracy of the formulæ with the actual pressure so determined in the four cells already described, we have the following—P in cell No. 4=225.8 pounds.

The actual pressure obtained by nineteen pressures were 211 pounds minimum, 238 pounds maximum, 224.5 pounds mean. P in cell No. 3=42.83 pounds; the actual pressures obtained by eighteen weighings were 41.5 pounds minimum, 49.5 pounds maximum, 45.5 pounds mean. P in cell No. 2=9.7. The actual pressures obtained by seventeen weighings were 7.5 pounds minimum, 9.5 maximum. P in cell No. 1—8,44 pounds and the actual pressures given by twenty weighings were 6 pounds minimum, 7.5 maximum.

The difference between the formulæ and the actual weighings are within the limits of divergence that must always remain with wheat, for it is itself favorable in specific gravity in size of grain, in adhesiveness among the grains and in its moisture.

BOSTON ELEVATORS.

There are four elevators in Boston, the largest being the Boston & Albany Elevator at the Grand Junction wharves, East Boston. This building is 400 feet long, 75 feet wide and 125 feet high, and has a capacity of 1,000,000 bushels. The machinery is driven by a magnificent engine of 600 horse power, and twelve cars can be drawn in at the same time, the unloading requires from eight to twelve minutes, which includes the carrying of the grain to the top of the building, weighing it and dropping it into the bin. As each car holds 500 bushels, some idea can be formed of the rapidity that is needed to handle 6,000 bushels in this short space of time. This elevator contains 180 bins, each holding from 5,000 to 8,000 bushels, and it can dispose of 360 cars per day, if the sales are sufficiently prompt to take it away. The Shawmut elevator has a capacity of fifty cars, the Mystic wharf 100, and the Chandler-street elevator, also owned by the Boston & Albany corporation, has a capacity of 500,000 bushels, the latter building being used exclusively for the local business, but all of these are not sufficient to accommodate the grain trade of the port. The cars are drawn into the East Boston elevator by its own power, thus avoiding the smoke and dust from a locomotive. Just before the door of each car is a hopper, and connected with it is the elevator proper, which carries the grain to the top of the building. There are twelve of these elevators, which are simple rubber or leather belts, running in wooden groves over pulleys, and connected with them are sheet-iron boxes. The grade of the grain having been determined, two men enter it, and with enormous steam shovels convey the grain into hoppers, from whence it is taken by the elevators to the receiver, in the top of the building. This receiver is in reality a huge scale, and is connected with the room below by iron rods, so that the weight of each car is indicated as soon as it is unloaded. The weight of the grain and the number of the car is then placed in a book by the milling engineer, and is entered to the credit of the owner. This receiver, to which the grain is sent, is not the storing bin, but it is carried from there to a bin below the receiver, where it is kept until ready for shipment. Beneath the receiver is a curiously constructed hopper having fifteen outlets, any one of which can be opened singly by turning a dial in the office below. After the grain is weighed, the bin for its reception is designated, the dial is moved to the number representing that bin, a rope connected with the bottom of the receiver is pulled and the grain is emptied into the the hopper. Every outlet, however, is closed except the one leading to the designated bin, and the grain is soon stored with that of similar grade. This is done until the bin is full, when a check, showing the number of pounds or bushels and also the quality and grade, is hung upon the facsimile of the bins in the counting room. When it is wished to ship the grain, the merchants owning that in one bin agree, at a meeting of the exchange, to send it on a certain steamer, the books showing how much each man is entitled to. The steamer is brought to the dock, and if she is to carry different grades her hold is divided into sections; if not, the grain is put in altogether. The grain has to be elevated again to load it into the vessel, and for this purpose hoppers, similar to the ones near the cars, are placed under the storing bins, and from them the grain passes again into the receiver. The weight is again noted, whenever the receiver is full, after which another aperture in the receiver is opened leading into an iron spout which conducts the grain out of the building and into the steamer's hold. At the Grand Junction elevator there are six of the spouts, which can all be operated at the same time, and 150,000 bushels may be loaded in about twenty-five hours. There are also three spouts on the other side of the elevator from the steamers' dock, so that schooners and other sailing vessels can be loading at the same time. In this elevator there are many new inventions to facilitate the handling of the grain, so that very little manual labor is required.

WORRELL'S COMBINED DRIER AND COOLER.

We take great pleasure in presenting to our readers an excellent engraving, which almost describes in itself a new invention, of great importance to grain dealers, for drying and cooling grain and other material in one operation in the most thorough manner by the joint use of hot metal surfaces and forced currents of hot and cold air. To quote from an article written by a prominent manufacturer who has given this method of drying careful study and many experiments: "The science of drying is in itself exceedingly simple, but to those who are entirely unacquainted with it it appears mysterious, for the reason that the medium for carrying off the water being air is not visible. All the science there is about it is that the air absorbs moisture as a sponge absorbs water. * * * * Heated air will absorb moisture in proportion to the increase of its temperature. A cubic foot of air at 32° will carry off only two grains of water, while at 160° it will carry off sixty grains, hence the necessity of heating the air which should be as dry as possible and made to move rapidly, so as to wipe off the moisture from the surface as it works its way out from the center of the body being dried." The inventor of the machine herewith illustrated has, after ten years of practical experience with three different driers, supplied a machine which he is confident carries out the ideas just quoted in the most simple and effectual manner. It is all iron, with no bearings exposed to the heat, simple, and therefore not liable to get out of repair; requires little power; for work done it consumes a small amount of fuel, coal, coke or charcoal, and is very economical to operate, and it presents large surfaces so as to utilize all the heat.

This machine is virtually a new departure among driers, being constructed so as to cool the material being dried as well as dry it in one and the same operation. All persons who have operated drying machines know how much labor and trouble it requires to cool grain (to prevent it from "heating" in bulk) after it has been discharged from the drying machines ordinarly used. In fact this labor is often greater than that required to dry the grain. This very serious objection is entirely overcome in Worrell's Combined Drier and Cooler, which of course largely increases the value of the machine.

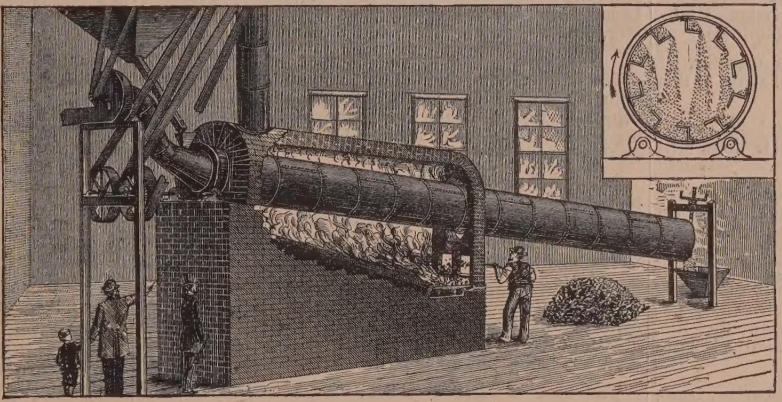
A few words will suffice to explain the engraving so that any one can easily understand the operation of the drier. The furnace surrounds about one-half of the long drying cylinder, which is slowly rotated by the friction wheels connected by short shafts with the two pulleys seen at the left. The exhaust fan is shown just above these pulleys. The grain or other material being operated upon is fed into the cylinder through the air-spout where it is spread by the troughs which run the entire length of the case into a number of thin streams, as represented in the enlarged cross-section of the cylinders shown in the upper right hand corner of the cut. This view gives a good idea of the large amount of metal surface furnished for heating the grain and air, and what a very large surface of grain is presented for the heated currents of air to absorb the moisture from. Owing to the inclination of the case, which can be varried while in motion by the screw shown, the grain gradually passes to the lower or discharged end.

After it has passed through that portion inclosed by the furnace, the cooling part of the process is accomplished by the same current of air which is drawn in at the lower end, which is open. The grain is here discharged into the hopper in a dry and cool condition, suitable for storing in bulk for shipment or immediate consumption. It is also greatly improved in appearance, being polished and the light chaff and dust taken out. It will be noticed that the grain nowhere comes in contact with the gases of combustion, and consequently it is not tainted and thereby rendered unfit for food.

This machine is adapted for drying and cooling damp or musty grain, seeds, berries, fruits, brewer's grains, tobacco, and other granular substances. It is peculiarly suited for drying corn for export meal, or new corn, so that it will be graded as old. Elevator owners are requested by the proprietor to note that this machine, without the use of a furnace, is just what they need to cool heated grain.

There is no danger of scorching grain in this drier on account of the rapid current of air drawn through it by the exhaust fan.

This invention is covered by letters patent, dated April 25, 1882. The inventor is prepared to furnish these machines of any size up to the capacity of 5,000 bushels per day. He is now operating one of 100 bushels capacity per hour at Hannibal, Mo., where he would be pleased to exhibit it to any interested parties. For prices or any further particulars address the patentee, S. E. Worrell, Hannibal, Mo.



WORRELL'S COMBINED DRIER AND COOLER.

GRAIN CULTURE IN OLDEN TIMES.

The history of grain culture among the inhabitants of Great Britain in ancient times is obscure, as is all their history in those semi-barbarous periods; but there is no excuse for the statement made in some popular books, that it was introduced by the Romans after their conquest in B. C. 55. The narratives of Cæsar and others show that grain was largely produced and stolen by the Roman soldiers from the inhabitants, who fought bravely for their grain fields. The truth is the cultivation of 'corn" was more or less known and in use among all Caucasian natives from an unknown antiquity.

The grain used in Great Britain in early times consisted of oats, rye and angular barley. The "Book of Trees,' a Bardic manuscript of the Sixteenth century, assigns the introduction of wheat to a date as late as B. C. 400, but this was probably simply some new variety. Tradition says that Colh, of unknown date, imported barley and taught the people to sow grain in furrows, and a system of joint cultivation of the soil, which last custom still prevails in Wales. The Malmutian code, about 430 B. C., contains regulations as to tillage and harvests. Hectarus, born 459 B. C., states that the island was so fertile as to produce two crops of grain annually. The Argonautic Poem speaks of Britain as the specially favored resort of Ceres. Strabo and Diodoros Sidulus enumerate corn among the many products of the island, the latter saying that they cut off the ears of corn and store them in subterranean repositories. Pliny describes the cutting of corn by a machine drawn by horses, as done in Gaul, where he claims the bolting sieve made of horse-hair was invented; but Julius Cæsar states positively that all the inventions and improvements of this kind originated in Britain.

The Gauls having, as we have noticed above, mowing machines, were of course excellent farmers. Tacitus furnishes abundance of evidence that the Germans cultivated grain. He speaks of a drink made among them fermented out of barley or grain into a certain likeness of wine. Constant allusions are made by him to their grain fields, their ploughing, etc., and the imposition of "measures of corn" as a tax upon the slaves. Among the German races industry did not keep pace with the fruitfulness of their fields. The Aestui, however, a remote tribe, whose language was that of ancient Britain, are represented by the Roman historian as patiently toiling at grain and remarkable for their patience and industry in agriculture.

The Oregon Lesislature passed a joint resolution asking Congress to pass an act of incorporation of the Nicaragua Canal Company, which will be filed with the Secretary of State at Washington, for presentation to Congress next session.

THE IMPROVEMENT OF THE MISSISSIPPI.

The problems in Hydraulics presented by the Mississippi River, though of the utmost national importance, have so far failed of a solution which commands the general assent of either scientific or practical men. On the one hand, the question mainly to be considered by the Government is how the channel of the river, by the permanence of its position and a sufficient depth of water at all times, may be rendered most available to commerce. On the other hand, to the cultivators of the rich alluvial soil of this great valley, the question, often involving not only home, stock and crops, but life itself, is how to constrain within safe limits the mighty volume of its waters that in time of high floods rises at places above the roofs of ordinary houses, and sweeps over a breadth of from 20 to 200 miles, a vast inland sea. To meet the difficulties involved two general plans have been proposed by engineers, with infinitely varied details: The one most conspicuous, and in accord with the universal experience of mankind hitherto, aims to restrain the river, as far as practicable, within the limits of a single channel by means of the levee, revetment and "jetty" system. The other, more recently brought to the front, and now being urged by some writers in our dailies and popular magazines, styled the "Outlet System," proposes to multiply and straighten new channels, to clean out some and render them available in case of floods by means of lock-gates, thereby doing away, as is claimed, with the need of levees to guard the overflow. Of the latter system, David A. Curtis, in the September number of *Harpers' Magazine*, seems to be an advocate.

The whole valley of the Mississippi, once an inland sea, is a deposit of silt, "at least a thousand feet deep," made during the passage of untold ages, and in a like future promising to fill up the whole Gulf. This mud furnishes no immovable rock foundations for strong works. The variableness of the volume of water too defies engineering skill. "One can manage a puddle, or protect one's self from the sea; but against a thing which is alternately a puddle and a sea it is difficult to act." To the levee system it is objected, that while it may serve to protect one spot of land, as notably at Cairo, which during the floods this year stood fourteen feet below the river level, and required an addition of two feet to the levee during the flood's continuance; but this is done to the detriment of other places upon which the overflow is spread. The engineers' main objection to the outlet system is that it fails to meet the great desideratum, a single channel, presenting between the river and its enclosing surfaces the least friction, rather than a multiplicity of channels. The matter has been practically settled for the present by act of Congress. In 1879, the Mississippi River Commission was appointed, having as a member and leading spirit the distinguished western engineer, James B. Eads, who had just successfully completed the jetties in the South Pass at the mouth of the river. After a careful survey and consultation with engineers at home and abroad, the Commission reported favorably upon the plan of Capt. Eads. The report was adopted by Congress, who have made liberal appropriations for carrying on the work under the direction of the Commission.

The plan adopted is very complex and is based largely on the principles applied, and methods used in the jetties. The river is to be narrowed to a uniform width of 3,000 feet by banks created by mattresses of woven brush and wire, such as have been so effective on the above named jetty construction, in order to scour out the river bottom where too shallow; while by the same means the deeper places are to be filled up. These mattresses are to be placed where required to encourage the settling of sediment, and will be held in place with rubble stones, and in places stone pavements are to be constructed. The levee system is also by the plan to be strengthened, though this is not the work of the Commission. The lowest estimate of the cost by members of the Commission is $33,000,000, while by other members the cost is estimated as not to exceed $46,000,000.

Wahpeton, Dakota, is to have a new elevator.

Elevator News.

J. W. Price has bought out T. A. Ellis, grain dealer, of Grafton, Neb.

Benton Harbor, Mich., is to have a 10,000 bushel wheat elevator.

Messrs. Griswold & Janey intend to build a new elevator at Evansville, Minn.

Mr. S. S. Rust, grain dealer at Oakland, Iowa, has sold out to Mr. F. H. Hancock.

Wilson & Co., grain dealers at Fort Collins, Col., are succeeded by Mr. F. K. Chaffee.

Mr. R. E. Moreland, grain dealer at Belle Flower, Ill., has sold out to Mr. B. Moreland.

Mr. J. L. Packard, grain dealer at Schuyler, Neb., has admitted Mr. H. C. Wright to partnership.

Messrs. Krack & Wohlenberg, grain dealers at Davenport, Iowa, recently dissolved partnership.

Messrs. Johnson & White, grain dealers at Mansfield, Ohio, are succeeded by Messrs White & Bro.

During the winter the Midland Railway Company will build an elevator at Belleville, Ontario, Canada.

An elevator at Grafton, Dakota, containing 6000 bushels of wheat, burst recently, letting the wheat escape.

Messrs. J. M. Schramm & Sons, of Pontoosuc, Ill., are building a 20,000 bushel elevator at that place.

Smith & Shelley, grain buyers at Grass Lake, Mich., made an assignment Sept. 25, with large liabilities.

Peter Schoenhofen is about to build an elevator, 72 by 100 feet, on Canalport avenue, near Canal street in this city.

The firm of Cripps & Comstock, Independence, Wis., are making cable connection between their flour mill and elevator.

A. B. McLean & Co. of Duluth, Minn., recently put a Deane pump and 60-horse power boiler into Elevator "C" at that place.

Elevator "B," at Duluth, Minn., put 44,500 bushels of wheat on board a barge in an hour and forty minutes. This is pretty quick work.

A grain elevator is being built at Jacksonville, Fla. The Webster & Comstock Mfg. Co., of Chicago, Ill., have the contract for buckets and belts.

The Paige Manufacturing Co., of Painesville, Ohio, furnish machinery to G. H. Lamberton, for his elevators at Utica and Lamberton Stations, Minn.

The elevator of Downey & Preston at Belleville, Ontario, Canada, burned October 4. It contained about 6,000 bushels of grain. The loss was $15,000.

A meeting of local capitalists is shortly to be held at Quebec to advance the project of a large grain elevator at the Grand Trunk Station, South Quebec.

The Webster & Comstock Mfg. Co., of Chicago, Ill., are furnishing the new flour mill of Geo. T. Chester, at Lockport, N. Y., with buckets and bolts.

The Pneumatic Grain Elevator Drying Company, of New York, capital $1,000,000, filed a certificate of incorporation at Albany, N. Y., September 30.

The new oat-meal mills being erected at Dubuque, Ia., have placed their order for buckets, conveyors, etc., with the Webster & Comstock Mfg. Co., of Chicago, Ill.

The Columbus Grain and Lumber Co., of Albion, Neb. have just placed their order for belting, buckets, etc., with the Webster & Comstock Mfg. Co., of Chicago, Ill

The Webster & Comstock Mfg. Co., of Chicago, Ill., are putting in three sets of their Coker Patent Power Steam Shovels in the John Hurd elevator at Toledo, Ohio.

Kellogg & Miller, grain dealers at La Crosse, Wis., have consolidated with Messrs. Kellogg & Lang, of Hastings, Minn. The firm name is now Kellogg, Miller & Lang.

The Webster & Comstock Mfg. Co., of Chicago, Ill., have just supplied the shafting, pulleys, conveyors and entire fittings for a large grain elevator at Loveland, Colorado.

The grain warehouse of Judge Williams, at Freeport, Ill., was destroyed by fire on the evening of September 29. The loss was about $4,000, partially covered with insurance.

Bismarck, Dakota, is to have a new elevator, with a capacity of 100,000 bushels. It will be built by a company composed of leading men of the town, and will cost $15,000.

Loran Clark & Co., of Albion, Neb., have just built a new grain elevator at that place. The Webster & Comstock Mfg. Co., of Chicago, Ill., have the contract for buckets, belts, etc.

The Minnesota & Dakota Elevator Company are placing an engine and boiler in their new elevator at Waverly, Minn., the capacity of which is 35,000 bushels. The Paige Manufacturing Co., Painesville, Ohio, furnished the above mentioned machinery.

F. Goodnow & Co., are building an elevator at Le Mascotte, Kansas, the machinery being furnished by the Great Western Manufacturing Co., Leavenworth, Kansas.

The Great Western Manufacturing Co., of Leavenworth Kansas, furnished the machinery for the elevator just completed by Giles & Gordon, at Wakefield, same state.

An elevator has been built at Assario, Kansas, by C. R. Underwood & Co, The Great Western Manufacturing Co., Leavenworth, Kansas, furnished the machinery.

The machinery for the Central Elevator at Minneapolis, Minn., G. W. VanDusen & Co., proprietors, is furnished by the Paige Manufacturing Co., of Painesville, Ohio.

Mr. T. P. Gordon has recently built an elevator at Morrisville, Kansas, the machinery for which was furnished by the Great Western Manufacturing Co., Leavenworth, same state.

The Chicago, Milwaukee and St. Paul Railroad are refitting an elevator at Owotonna, Minn. The Webster & Comstock Mfg. Co., of Chicago, Ill., are furnishing their specialties for the job.

The grain warehouse of Richardson & Son, at Kingston, Ontario, Canada, was burned September 27. It contained about 10,000 bushels of peas and a quantity of rye and wheat. Loss, $20,000; insurance. $12,000.

The Joliet Elevator Co., of Joliet, Ill., are building a half-million-bushel elevator at that place, Mr. James Leman being the architect. The Webster & Comstock Mfg. Co., of Chicago, Ill., have the contract for buckets and belts.

The half-million-bushel elevator being built at Louisville, Ky., by the Kentucky Public Elevator Co., has been supplied with the Coker Power Shovel, Lenox Car Loading Spouts, and elevator buckets by the Webster & Comstock Mfg. Co., of Chicago, Ill.

The Big Four Elevator at Cincinnati, Ohio, being built by the C. I., St. Louis & C. Railroad has adopted the Major buckets for the elevator, and the Lenox Spouts for loading cars. The Webster & Comstock Mfg. Co., of Chicago, Ill., have the contract.

The Webster & Comstock Mfg. Co., of Chicago. Ill., have recently supplied the Northwestern Elevator Co., of Minneapolis, Minn., with buckets for their new elevator at Minneapolis; also with supplies for some twenty small elevators being put up as feeders.

The firm of Hall & Irwin, of the "Great Western Mills," Woodstock, Ontario, Canada, who have been doing a large grain and milling business, have become involved in financial difficulties, owing to the conduct of Mr. Hall, who has disappeared.

The Great Western Manufacturing Co., of Leavenworth, Kansas, recently built an elevator at Hiawatha, Kansas, for Messrs. Speer & Hulbert. Among other machinery it contains the Barnard & Leas Duplex Separator, the Victor Corn Sheller, etc.

The Millers' Association of Minneapolis last year handled 10,000,000 bushels of wheat, requiring the use of $13,000,000 in money. The association estimates that 18,000,000 bushels of wheat will be required for the ensuing year, and has in the field between 250 and 300 buyers.

The belt which carries the wheat from Elevator B into the new 1,000,000 bushel storehouse at Duluth, Minn., is the longest one of its kind in the world, being three feet wide and 1,380 feet in length. The total capacity of Elevator B and the accompanying storeroom is 2.100,000 bushels.

The Jasper Elevator, at Quincy, Ill., has been rebuilt and newly equipped with new machinery for cleaning, storing and handling grain. It is situated on the river front, and has side tracks leading through it, giving it the most ample facilities for receiving and shipping grain by rail or river.

On Sept. 18. Charles A. Ketcham, clerk at the Alton Elevator, Kansas City, was arrested for stealing wheat. He employed an expressman for large pay to carry wheat away from loaded cars. His operations extended over several months, and the amount stolen was probably several thousand dollars.

One of the finest 35,000 bushel elevators in the Northwest is being built at Winona, Minn., by Mr. G. H. Krumdick. W. W. Doty, of Rochester, Minn., is the contractor and builder. The machinery is furnished by the Paige Manufacturing Co., of Painesville, Ohio. The elevator will have a 30-horse power engine.

Messrs. Durkee & Stout, of Fort Scott, Kansas, are building a large elevator, which will be ready for machinery the first of November. Mr. Chas. W. Parker, proprietor of the Columbia Iron Works of this city, has the contract for the entire machinery, including one of his Common Sense Automatic Corn Shellers.

Mr. Wm. Clark, of St. Boniface, Manitoba, has left the "St. Boniface Flour Mills" at that place, with the intention of identifying himself with the grain trade of Manitoba and the Northwest. He says in a letter to us: "I shall, no doubt, find your paper of great value, as this elevator question will soon force itself upon us here."

The Boston correspondent of *The Free Press* has a patent for treating grain for shipment. If he treats it as he does the readers of *The Free Press* his "chaff" will be the most valuable and delightful part of it.

The Kirkhoven Free Elevator, at Kerkhoven, Minn., inspector, H. S. Sjoberg, after the new addition is completed, will have a capacity of 67,000 bushels. The elevator handles wheat, barley, oats and flax. It has a good feed mill and in the oats house independent machinery. About seven eighths of the wheat received at that point, Mr. Sjoberg says is pure Scotch Fife.

The new Milwaukee RailroadElevator "A" at Minneapolis, Minn., is now in operation. This is the largest elevator west of Milwaukee, having a capacity of nearly 1,000,000 bushels. The operating force will number eighteen or twenty. Mr. E. E. Holt is superintendent, and Mr. Frank Holly assistant. Eight cars can be loaded at a time and 100,000 bushels can be received in a day.

The firm of L. M. Fortier & Co, grain dealers at Brandon, Manitoba, are about to make an addition to their warehouse of an elevator of 40,000 bushels capacity. Last year the firm handled over 25,000 bushels, and of the crops now being harvested they will handle not less than 150,000 bushels. This branch of the business is managed by Mr. Hilliard, who has had an experience of nearly thirty years in that line in London, Ontario.

Helmrich & Hansen, wheat and note brokers at San Francisco, failed Sept. 28, with liabilities of $160,000. The Pacific Bank caused the arrest of Hansen on a charge of grand larceny. It is claimed that he went into the bank on Sept. 27, and asked permission to take away with him three notes made to Degener & Co., representing amounts aggregating about $60,000. Hansen failed to return the notes to the bank, but returned them to the makers. He is now out of prison on $20,000 bail.

The Prairie City and First National Banks, at Terre Haute, Ind., were recently victimized out of $2,600, by a man representing himself to be A. J. Thompson, an extensive grain dealer, by paying money on duplicate bills of lading, the word "duplicate" having been erased by means of oxalic acid. The money was drawn September 22, and Thompson has disappeared. He had previously defrauded the Worthington Bank of $1,900 by the same trick. He is described as about 45 years old, has a flat nose, heavy build and dark complexion.

The following parties have recently purchased the Kaestner mill, made by Charles Kaestner & Co., of this city: Martin Grube & Son, Huntingdon, Pa., a 24-inch mill; A. T, Wilson, North Fork, Wyoming, a 20-inch mill; Schuttle & Quilling, Menomonee, Wis., a 16-inch mill; Amana Society, Amana, Iowa, a 24-inch mill; Anderson Bros. & Merritt, Coin, Iowa, a 16-inch mill; H. Eyler, Newhall, Iowa, a 16-inch mill; Galby & Aaker, Ridgeway, Iowa, a 16-inch mill; L. M. Rumsey Co., St. Louis, Mo., two 24-inch mills; O. L. Packard, Milwaukee, Wis., three 24-inch mills; C. W. Howard, Neenah, Wis., one 20-inch mill; M. H. Avery, Albert Lea, Minn., one 20-inch mill.

One of the heaviest millers of Minnesota, who owns twenty-three elevators, writes as follows: "Our receipts of wheat are far below our expectations, and we can only account for it by judging the farmers are not satisfied with the prices, and enough are able to hold until they can get their fall work done, when they will no doubt market. They are all busy plowing or threshing, and in consequence receipts are small. We have bought so far at all our stations 20,000 bushels new wheat, hardly enough to start up our mills. The grade has been most fifty-six pounds in the dirt, and a few cars from the Jim river valley go fifty-eight pounds. We clean all our wheat at the mill, shipping it from our houses as it comes from the farmers."

The Link Belt Machinery Co., of this city are building a large tanbark conveyor 220 feet long, for the American Tanbark Co., Cincinnati, and a link belt chip elevator for the Forest Paper Co., Yarmouthville, Me. They are fitting out a malt house with elevators, shafting, driving belts, etc., for F. Davis, Jr., Watkins, N. Y., a cotton elevator for the Carver Gin and Machine Co., Memphis, Tenn., and one for James F. Stokes, Terrence Miss. They have shipped to N. Shelton, Omaha, Neb., a large sand elevator, to be used digging a well 30 feet in diameter for the Freeport water works; a large oil barrel elevator for Lumbard, Ayers & Co., New York City, also a link belt starch elevator to J. Everding & Co., San Francisco, Cal., every part of which is galvanized.

The 1,000,000 bushel elevator at Duluth, Minn., built by J. T. Moulton & Son, Chicago, Ill., for the Lake Superior Elevator Co., is now in operation, It is called Elevator "C." J. T. Moulton & Son planned and superintended its construction, the Elevator Co. furnishing the material. They bought the machinery of the Union Foundry and Pullman Car Wheel works of this city. This elevator is more properly an annex to Elevator "B," because, while it has been designed in such a way that the machinery can at any time be put in to make it a separate elevator, it is built so that it is filled by a belt conveyor thirty-six inches wide, enclosed in a gallery about 100 feet long, connecting it with Elevator "B." This conveyor gallery is on a high trestle-work and extends along the top of the bins. A similar conveyor below the bins is to take the contents of Elevator "C" back to Elevator "B" when required to ship the grain. The building is covered with iron and is substantial and strong throughout.

Mechanical.

Belts.

Horizontal, inclined, and long belts give a much better effect than vertical and short ones and those which have the driving side below than otherwise. Belts which run loose will of course last much longer than those which must be drawn tightly to drive, tightness being evidence of overwork and disproportion. Belts which run perpendicularly should be kept tightly strained, and should be of well-stretched leather, as their weight tends to decrease their close contact with the lower pulley. Belts of coarse, loose leather will do better service in dry, warm places; for wet or moist situations the finest and firmest leather should be used. Care should be taken that belts are kept soft and pliable.

Strength of Shafts.

The strength of a shaft to resist twisting is proportional to the cube of its diameter: thus a shaft one inch in diameter will safely sustain a weight of 150 lbs. on a lever 12'' long, while one 2'' in diameter will sustain a weight of 1,200 lbs., or eight times 150 lbs. In ordinary practice, on account of the ever-present bending action, an allowance has to be made, great or small, according as the bending is greater or less. When it is small, as in the case where there are no intermediate pulleys, and the shaft simply receives its power at one end and delivers it at the other, the shaft should not be strained to a greater extent than 75 lbs. on a 12'' lever would strain a shaft 1" in diameter. For ordinary line shafts it should only carry 37.5 lbs., and for prime movers, or the first length of a line shaft where the pulley and belt is large, 18.75 lbs.

Management of Engines.

Blow through the test tap at the bottom of the guage hourly, as well as through the tap in the bottom neck, and the tap in the top neck twice daily. These taps should be blown through more frequently when the water is sedimentary, and whenever the movement of the water in the glass is at all sluggish. Should either of the thoroughfares become choked, clean them out with a wire. Work the floats up and down by hand three or four times a day to see that they are quite free. Always test the glass water guages and the floats thoroughly the first thing in the morning before firing up. It does not follow that there is plenty of water in the boilers because there is plenty of water in the guage glass. The passages may be choked. Also empty guage glasses are sometimes mistaken for full ones, and explosions have resulted therefrom. Hence the importance of blowing the test taps frequently.

The Transmission of Power by Shafting.

The transmission of power by shafting is a very important feature in nearly all works,and when developed to the utmost will effect a great saving in the expenditure of power itself. Mr. Wilhelm Ritter, of Altona, Germany, who has studied this subject very minutely, has propounded a scheme of his own, by which in order to transmit the motion and power of a shaft, fitted in bearings, to one or more shafts, he proposes, over one of the ends of a motive power shaft, to place a box or a right-angle shaped bracket, and a conical wheel fastened to the outer end of this shaft. The other angle of the bracket is likewise formed as a box, the outer part of the boring being enlarged for the reception of a cylindrical prolongation of a similar bracket, and is furnished with a set screw to secure the second bracket, which can be turned within the enlarged boring of the first one in any desired position of a circle. A short axle passes through the box of the second bracket, the corresponding projection and the box of the first bracket, and each end of this short axle is furnished with a conical wheel fastened to it, and one of these wheels is in gear with the wheel of the motive power shaft, while the other conical wheel is in gear with a similar wheel fastened to the end of a shaft that revolves in the boring of the other box of the second right angle bracket. The shaft of the second bracket, by means of this gearing, is put in motion, and the axis of the shaft can be turned in any position within the plane of a circle, after loosening the set screw and turning the second bracket in the boring of the first one. When the shaft of the second bracket has been brought in the desired direction, the position of the two brackets to each other is secured by means of the set screw. Two further pair of conical wheels, other two angle brackets of like construction and connection, and another short axle, will transmit the power to a third shaft, and by this means motion and power can be continued to other shafts, the last of which may be constructed for the reception of a tool or implement. The arrangement is simple and ingenious, and capable as it is of almost unlimited application,is one of the most useful inventions that has ever emanated from the German mind.

Accidents From Belts and Shafts.

The number of distressing accidents occurring lately by reason of exposed belts and shafts in establishments using machinery, calls for extended reform in this direction. Items in the daily papers about workmen being caught up by driving belts or shafts, and crushed in the machinery, are becoming alarmingly frequent, and suggest the idea that when business is brisk in a manufacturing establishment, precautions for safety are almost ignored. Driving belts and shafting where exposed and likely to come into contact with individuals required to pass near them, should be boxed or covered in some way so as to prevent the likelihood of accident. Elevators, too, have proved very treacherous of late, showing that increased care is required in designing and constructing these useful contrivances. Many accidents are attributable, at times, to carelessness of workmen, as for instance, getting fingers chewed up in lathes, pounding off thumb nails, and falling through open hatchways, but the prime cause of the most serious mishaps are too often found in defective arrangements. We commend this subject to careful consideration.

Managing Belts.

A mechanic gives the following directions for managing belts. He says: "I have for the last 25 years, on every Saturday evening, turned the inner side of my engine belt outside, let the engine run slowly, and washed the belt well with warm water and soda, applied with cotton waste. Next I take a piece of sheet metal and scrape the belt well, then wash with clean warm water and dry off. I collect the waste oil from the shafting and apply as much of it to the belt as possible. The washing must be done as quickly as possible, so as not to dissolve the glued parts. I let the belt stand on the pulleys till Monday, then give another scraping and turn the belt as before. I keep the pulleys very clean. I have long been surprised at the economy I have effected with very little trouble. I have not bought a new belt for the last ten years. There is an engine near me 14 inches by 36 inches (mine is 12 inches by 36 inches). I have nearly double the shafting and belting, and my neighbor can not run with less than 38 pounds of steam when all the belts are on the loose pulleys. Mine will run at full speed with 5 pounds."

SOME FIGURES ON GRAIN TRANSPORTATION.

An article by Mr. R. Meyer, in an Austrian journal, gives the cost of transporting wheat from the various wheat regions of the world to the various centres of consumption. These calculations have been translated from the German, great care being taken to show the exact cost of the freight per bushel in dollars and cents. Below is the table:

FROM	TO	
San Francisco	England	$0 36@0 39
The "Far West"	Atlantic Harbor	---- 40
New York	Liverpool	---- 10
Chicago	Liverpool	---- 19
Bombay	England	---- 13
Calcutta	England via Suez	18 @ 29
Calcutta	England via Cape	15 @ 29
Australia	England	---- 21
Buenos Ayres	Havre	16 @ 20
Odessa	England or Antwerp,	13 @ 22

In the same interesting article the author says that the culture of wheat does not extend over more than twenty-two per cent. of the now cultivated land, and not over more than fourteen per cent of the arable land. He thinks that the cultivation of wheat will increase in the future. Quoting from Termoloff, Mr. Meyer says in his book, "Memoire sur la Production Agricol de la Russie," published in 1878, that Russia produced until the year 1877 an average of 227,000,000 bushels of wheat, and exported 57,000,000. Russia has now not over 14,000 miles of railroads, while the United States have not less than 92,000 miles.

SWITCHING CHARGES AT CHICAGO.

The General Freight Agent of the Chicago and Alton Railroad has issued the following circular to agents, shippers and receivers of grain:

On and after this date the following rules and charges will be established for the handling of grain arriving at Chicago: *First*, on grain billed to elevator held for reinspection or ordered to track, a switching charge of $2 per car will be made. *Second*, on grain billed to elevator and ordered to track, and afterward sent to elevator or connecting lines, a switching charge of $3 per car will be made. *Third*, on grain consigned in care of other lines at Chicago or points beyond, which is stopped for inspection, a charge of $1 per car will be made. *Fourth*, on grain held out for reinspection, consigned for delivery on track, or held for "further orders," which is not disposed of within forty-eight hours after arrival, a demurrer charge of $3 per car per day or part of a day will be made. *Fifth*, on grain consigned to a Chicago house, either for delivery to elevator or on track, ordered turned over to a connecting line for further shipment, a switching charge of $2 per car will be made, and demurrage at the rate of $3 per car per day or part of a day will be charged twenty-four hours after delivery of car if connecting line is not furnished with shipping directions within that time, which charge will continue until such shipping directions are furnished.

FREE CANALS IN NEW YORK.

The canal system of this state originated in 1816. Mainly by revenues raised from tolls imposed by the state on boats, freights and passengers, the canals have not only paid for their construction, their maintenance, and their enlargement, but from time to time they have contributed to the treasury large sums of money, which have been expended for general purposes. The total amount thus paid to the state within the past sixty years, and which has been appropriated to objects wholly aside from the canals, reached an aggregate of many millions of dollars.

The Erie canal and its principal branches have been of incalculable value to the state by affording facilities for our citizens to reach markets for their productions, and by securing to our chief cities a large and lucrative share of the trade of the growing West. In process of time, however, our canal system has arrived at a stage where it suffers from the sharp competition of numerous railways, and from the rivalry of two water routes from the West to the seaboard, the one by the way of the Mississippi to the Gulf of Mexico, and the other by the Welland canal around the falls of Niagara, and down the St. Lawrence to the ocean.

To enable our canals the better to encounter this competition and rivalry it has been deemed expedient to propose amendments to the constitution which, on the one hand, shall relieve them from state tolls and thus reduce the cost of transportation, and, on the other, provide for their maintenance by general taxation. Those familiar with the subject believe that the adoption of these amendments will very materially aid the canals in the struggle to retain their hold upon the trade of the West, while the opinion gains ground that by this mode alone can our canal system be prevented from rapidly sinking to decay, and a due check be imposed on the attempt to monopolize transportation.

These amendments are to be voted upon at the next election. They have warm advocates and vigorous opponents in each of the great political parties. The benefit of the canals to the chief commercial marts of this state is conceded by all, while it is generally admitted that the abolition of tolls would help our citizens in the contest for retaining their due proportion of the seaboard business of the Western states. The main objections urged against the amendments is that it would be unjust to tax for the support of the canals the people in those portions of the state which lie remote from them. In deciding whether the whole state ought to contribute to sustain our canal system, it should be remembered that the millions of dollars drawn from the canals and appropriated for general objects have in times past relieved the people from the payment of that amount of taxes; and that, in fact, the state at large now owes that great sum to the canals. As this is not a party question, the ratification of the proposed amendments will depend upon the zeal of their supporters, irrespective of ordinary political combinations and appliances.—*New York Sun.*

Legal Notes.

Warranty of Machinery.

The Supreme Court of Iowa has decided that when machinery is purchased with a warranty that it is in perfect order, and the vendee receives it and puts it in operation with full knowledge that it is defective, he is not entitled to receive damages for the breach of warranty.

Board of Trade Contract.

Appellee traded on the Board through appellants, his brokers, giving his orders through one, W. Being pressed by appellants for more margins, and making no reply, appellants changed his deal, by order of W. from September to November oats, and then sold out at a loss and brought suit against appellee to recover such loss. *Held* that the facts failed to show authority from appellee to W. to direct the change in the deal, and consequently he was not liable therefor.—Bensley vs. Moon, Appellate Court, Ill.

Sale of Grain in Car.

In a contract of sale of the contents of a car loaded with grain, the quantity of which is unknown, and the sale is for cash, to be paid as soon as the grain can be weighed, which weighing is necessary in order to ascertain the price to be paid by the buyer, and there is no provision as to the delivery, the property in the grain does not pass to the buyer by the bargain, even though the weighing is to be done by him. The payment of the price is a condition preliminary to passing the title.—Hoffman vs. Culver, Appellate Court, Ill.

Broker's Liability.

J., a broker, deposited a margin, by order of G., with B., another broker, who afterward failed. As no security was obtained from B. by J., G. brought suit for the recovery of the money. The Court held that it was optional with J. to demand security, and that as B. was in full credit at the time of the deposit, J. acted in good faith, and that there was no evidence of negligence, such as would make G. responsible for a loss occurring through B.'s insolvency.—Gheen, Morgan & Co., v. Johnson, Supreme Court, Penn.

Warehouse Receipts.

A warehouse receipt, though not in the commercial sense of the term negotiable, is an assignable instrument, The assignment and delivery of such an instrument vests the legal title to the property in the assignee, without notice to the warehouseman. The statement in such an instrument that the property is to be delivered upon order, upon the return of the receipt, is a representation upon which the assignee has the right to rely. And if, after the assignment and delivery of such an instrument, the warehouseman, without the consent of the assignee, delivered the property to the person to whom he had given the receipt, he will be liable to the assignee for the value thereof, although he had no notice of such an assignment.—First Nat. Bank of Cincinnati vs. Bates, U. S. Dist. Court, Southern Dist., Ohio.

Curious Prosecution of a Warehouseman.

A Philadelphia correspondent of the *Northwestern Miller* states that a criminal prosecution was brought against Robert A. Bucher, an extensive grain dealer at New Kingston, Pa., for selling grain held in store by him on receipt, in accordance with a usage which has been in existence in the Cumberland Valley and other grain growing districts of the state for a period of more than twenty years. The defendant was convicted by the verdict of a jury after a very able defense under an act of the state Legislature, passed in 1866, the fourth section of which reads as follows: "No warehouseman, wharfinger or other person shall sell or encumber, ship, transfer, or in any manner remove beyond his immediate control any goods, wares, merchandise, petroleum, flour or other commodity for which a receipt shall have been given by him as aforesaid, whether received for storage, shipping, grinding, manufacturing or any other purpose, without return of such receipt." The custom above referred to was about as follows: When a farmer had any grain threshed which he did not wish to dispose of at once, he would have it hauled to one of the warehouses near by, taking a receipt for the grain, the receipt sometimes specifying the date when to be sold, at other times not. No storage was charged, and by common consent the warehousemen were permitted to dispose of the grain as they choose, simply paying the market price when called for and assuming the loss or gain in the transaction. This mode of operation had received the tacit consent of the farmers who choose their own times to present their receipts and obtain their money. Mr. Bucher's receipt was dated Kingston Station, May 14, 1881, and purported that he had received of J. Hetrick 366 48-56 bushels of corn in store and signed. Mr. Bucher failed and could not pay for the corn which he had disposed of. The result of the trial was as above stated.

Trading in Options.

Among the interesting decisions of the courts the following will interest most of our readers. The defendant in error brought this action to recover the sum of $10,000 alleged to have been loaned to the plaintiffs in error for the purpose of trading in wheat on margins in future options. It seems there was an understanding between plaintiffs and defendant that they were to force the price up and create what is understood as "a corner," and the defendant in error was to participate in the profits, but not in the losses. This the plaintiffs in error denies, and they affirm that he was to participate in the losses as well as the profits. In the trial court the plaintiff recovered judgment for the sum of $3,027.53, and the defendant below appeals. *Held* that an agreement having for its object the control of the market as above stated, is against public policy, and this court will not lend its aid in enforcing such contracts. If parties see fit to invest money in such ventures they must get it back by other than legal process. Cases cited: Morris Run Coal Co. vs. Banlay Coal Co., 68 Pa. 173; Arnott vs. Pittston & Elmira Coal Co., 68 N. Y. 558; Rex vs. Waddington, 1 East 143 and S. C. East 167; Bishop of Crim. Law §§ 527,528; People vs. Fisher, 14 Wend. 9. Judgment of lower revised—(Campell, J.)—Raymond et. al. vs. Levitt.—N. W. Rep., July 16, 1881.

A Decision in Options.

The Supreme Court of Wisconsin has recently overruled the findings of the Circuit Court below in a case of a suit to recover dues for adverse "margins" from the speculator, brought by the broker employed. The principles involved would seem to be the same as in the one recently decided by Judge Gary of this city favorable to the brokers. Four years ago an Iowa grain dealer employed a broker of Milwaukee to buy and sell grain for him, in form, for future delivery and account for the profits, which were kept in a separate book. In the correspondence the terms "scalping," "options," "speculating deals," etc., were freely used. The transactions turning out disastrously, and the defendant refusing to pay the losses, the suit was brought originally for over $2,000, but afterwards dropped to $800. The defendant claimed that it was wholly a gambling transaction with no expectation of buying or selling any grain. The Supreme Court found that this was proven, and in fact sustained by the testimony of the plaintiff; that the pretended losses occurred in transactions "not only illegal and void, but criminal." The decision concludes as follows: "The Circuit Court erred by withdrawing the case from the jury and by ordering a verdict. The judgment is reversed and the cause remanded for a new trial."

A Decision on Hedging.

The practice of "Hedging," a term familiar in the gamblers' books, is common also with Board of Trade speculators, as appears in a recent case brought before Judge Gary of the Superior Court of this city. This term in gamblers' parlance, means the offsetting of a bet which appears to be on the losing side by another on the opposite side in the same transaction, as on competing horses in the same race, etc. Mr. Cothran, a resident lawyer, formerly a judge in New York, commenced speculating in grain last December, and employed Ellis & Lightner, brokers and members of the Chicago Board of Trade. His fortunes varied, sometimes having a margin for further deals, again tempting him into "hedging" to cover a loss. The above named brokers brought suit to recover $5,000 owed them by Mr. Cothran for margins. The latter, in response, claimed that at the time of this loss, learning the state of the market, he ordered his brokers to sell for him for future delivery, which they refused to do, and he estimates his loss thereby as not less than $7,000. A jury having been waived, Judge Gary decided that one deal could not offset an other. When a market was adverse, and margins were called for on an impending deal, in default of which it could be closed out, the operator could not buy or sell as the case might be and expect the profit in the latter case to stand as margins in the former. Both deals must be considered distinct and separate. Ellis & Lightner obtained a finding in their favor for $2,788.63.

WHERE WHEAT IS RAISED.

No changes which have occurred in the agricultural relations of our country are more marked than those in connection with wheat. Thirty years ago New York and Pennsylvania were distinguished for their large crops of wheat. The report of the Commissioner of Agriculture for 1844 shows that New York, Pennsylvania and Ohio produced nearly one-half of the total wheat crop of that year. Ohio then led New York by nearly one million bushels: the whole quantity produced by the three states being forty-one millions. In 1870 Illinois took the lead, showing a production of thirty million bushels, and Iowa and Minnesota have stepped toward the front rank as great wheat fields. Now the wheat crop of Minnesota is greater than that of the New England states, New York and Pennsylvania combined. The changes in the wheat growing areas have been followed by changes in the location of the milling interests. this is what would be reasonably expected. The causes which have brought about these changes are found mainly in deterioration of the soil of the older states, making it unprofitable for wheat growing, and the increase of population, which has turned the attention of the inhabitants mainly to manufacturing,industries. Besides, as fast as the soil has become exhausted it has been abandoned or devoted to some other crops. Wheat producers have sought to obtain their crops at the smallest expenditure of labor and of manure, and there being an abundance of land of rich and virgin character in Western states, they have gone thither. The rapid exhaustion which has taken place in the wheat soil can be seen in the fact that twenty-five years ago New York lands which produced forty bushels to the acre now yield scarcely one-half their former crops, and that only by fertilizing. The same can be said of Pennsylvania and Ohio. In 1870 Pennsylvania had three thousand flour mills, the largest number in any one state; New York came next with two thousand; then the New England states with nearly the same number. Since 1870 the milling interests have grown and flourished best in Illinois and the Northwestern states. Over two thousnnd flour mills have been erected in Illinois, Wisconsin, Iowa and Minnesota. The total number of mills in those states now is nearly five thousand. More than half the twenty-five thousand in the country are now west of Ohio. The improvements in trade facilities are maked, too, flour being shipped now directly from Minneapolis to Liverpool, and occupying only two weeks in the transit. Considering the advantages of the great West in the way of water supply and fuel, to say nothing of the soil, it would be entirely out of the question for the East to compete with it in wheat production, and the tendency will naturally be toward the absorption of the grain interest there.

Although the annual needs of California in bags to sack its grain crop amount in value to between $2,500,000 and $3,000,000, they have been heretofore mainly imported from Great Britain and Calcutta. One of the first to grasp the situation and take advantage of it was the Pacific Manufacturing Company, of San Francisco. This company employs 400 hands, turning out 10,000 bags per day, and will do its share towards materially reducing the bag importation figures of California.

Says the *Artisan*, of Nashville, Tenn.: "Here's our ☞ to the newest of Chicago trade journals, the AMERICAN ELEVATOR AND GRAIN TRADE. The eminent success which the *American Miller* has achieved, removes from this new venture under the same management any element of uncertainty which might have attached to it in less experienced hands. The initial number gives evidence that there is a fruitful field for just such a paper, and the generous use of its columns by advertisers shows that there will be no lack of support for a journal devoted to one of the most important commercial industries of the world. Published by Mitchel Bros. Company, Chicago, on the 15th of each month, at $1.00 per annum."

Late Patents.

Issued on September 12, 1882.

GRAIN AND STRAW SEPARATOR.—Daniel Murphy, Dubuque County, Iowa. (No model.) No. 264,190. Filed June 6, 1882.

Issued on September 19, 1882.

WEIGHING AND TRANSFER CAR.—Lloyd D. Richardson, John R. Trimmer and Eugene E. Loomis, Chicago, Ill. (No model.) No. 274,762. Filed May 11, 1882.

GRAIN CLEANING APPARATUS.—Daniel Best, Albany, Oregon. (No model,) No. 264,508. Filed July 26, 1882.

GRAIN SEPARATOR AND CLEANER.—Daniel Best, Albany, Oregon. (No model.) No. 264,509. Filed May 16, 1881.

GRAIN SEPARATOR.—James B. Suitt, Indianapolis, Ind. (No model.) No. 264,490. Filed August 30, 1882.

Issued on September 26, 1882.

ELEVATOR BUCKET.—Peter Ehlers, Albany, N. Y. (No model.) No. 264,939. Filed August 25, 1882.

GRAIN CONVEYOR.—Henry Coker, Indianapolis, Ind. (No model.) No. 265,020. Filed June 7, 1882.

GRAIN MEASURE.—Blanchard Chamberlain, Bellefontaine, Ohio. (No model.) No. 265,019. Filed May 29, 1882.

PORTABLE ELEVATOR.—Robert Dunbar, Buffalo, N. Y. (No model.) No. 264,938. Filed July 17, 1882.

PNEUMATIC ELEVATOR FOR RAILWAYS.—Chas. A. Needham, New York, N. Y., assignor to himself and E. P. Needham, same place. (No model.) No. 265,129. Filed July 24, 1882.

SCREW CONVEYOR.—William Walter Hewitt, Swanscombe, County of Kent, England. (No model.) No. 265,078. Filed June 29, 1882.

Issued on October 3, 1882.

GRAIN SCREEN.—Isaac Esmond and Alvin H, Ford, Capron, Ill. (No model.) No. 265,398. Filed June 10, 1882.

GRAIN VENTILATOR.—Eli J. Barr, Litiz, Pa. (No model.) No. 265,370. Filed August 14, 1882.

PLATFORM WAGON DUMP.—Amos K. Ersland, Sheldaht, Iowa. (No model.) No. 265,251. Filed August 14, 1882.

THE CORNER.

The "true inwardness" of a "corner" is not always perfectly clear to the producer; and a farmer is at times surprised to find wheat suddenly rise in price at some speculating locality, when the foreign demand and price remain the same. To such persons this may perhaps be made clear by the terms familiar to operators, with an illustration of their methods and motives. Two classes of speculators, representing large amounts of money in rings or otherwise, are designated as Bulls and Bears; the one calculating on a rising market, the latter on lower prices. Bull quietly sets to work to get possession by means of associates of as much of the No. 2 spring wheat—which on account of its amount is the speculative quality of the Chicago trade—already in market, or within the given time coming in, as possible. When he thinks he has the amount necessary, he proposes to purchase of a member of the bear fraternity—say a million bushels of wheat, to be delivered during the current month. The latter, having examined the foreign market, and believing its tendency is downwards, and thoroughly satisfied that there is abundance of No. 2 wheat in market or coming in, offers to deliver the specified amount at an advance of two or three cents per bushel on present prices, Now the war of bidding in the market commences. Bull at once raises the prices, endeavoring to outbid Bear, so that in the final settlement the latter may be compelled to submit to the terms the former may impose. In this contest of bidding the local prices may go up 10 or 15 cents per bushel higher than the market price. If now the calculations of the Bull have been correct, and Bear fails to obtain the wheat, he must settle at the price which the bids in the local market have attained. As this is done by a payment of the difference in cash, it is easy to see what the latter will lose when the prices are known and compared. The gain of the former will depend on how much wheat he has on hand, which he purchased at higher than the market price, to which it will now return. It can hardly fail to be seen from the above that the corner is an advantaue to the producer, who can avail himself of the temporary increased price in selling his grain.

THE ST. PAUL ELEVATOR.

Among the large elevators of the Northwest, noticeable for the excellence of its structure and the completeness of its apparatus for handling grain and storage, is the elevator at St. Paul, Minn., on the St. Paul, Minneapolis and Manitoba Railroad, erected two years ago. The plans were drawn by Mr. G. W. Sherwood, of St. Paul, and executed under his supervision. The main building is 212x82 feet, 92 feet in height to the eaves, and 150 feet to the peak of the cupalo. The foundation is upon piers of St. Paul blue limestone capped with Red Wing stone. The piers are four feet thick at the top, expanding broadly at the base. The cupalo, 58 feet in height, has four floors of the same length as the building, 40 feet in width and contains the weighing and hoisting machinery.

The engine and boiler house, 75x43 feet, is built of Chaska brick, and is connected with the part of the elevator containing the stairway and pulley by a wooden gallery, some twenty feet from the ground, through which the belting runs from the engine. The smoke stack, built of the same material, is 20 feet at base, 8 feet at summit, and 156 feet in height. The iron flue is four feet in diameter throughout. Two massive piers, constructed and capped with the same material as the foundation, run through the centre of the building on the ground floor. In these piers are sunk 20 pits lined with boiler iron, from which the grain, having been received directly from the ears, is elevated to the bins above. The railroad tracks run along side on the same level with the pits, and the grain is transferred by means of steam shovels. From 14 of these pits the grain is conveyed directly to the cupalo; from the remaining six, dirty grain is conveyed into cleaning machines on the piers between the pits, and thence to the storage pits. The floors here are of solid masonry.

The bins for shipping and storage are above this story, 252 in number, 66 feet in depth, and having a storage capacity in all of over 1,000,000 bushels. Two immense pulleys hang at the west end of the building, the larger of which is 18 feet in diameter and weighs 9½ tons. This is connected by a 48-inch belt with a still larger pulley in the engine-room. On the same shaft with the first mentioned a somewhat smaller pulley carries a 54 inch belt, weighing over a ton and a half, to another immense pulley in the cupalo. Two lines of heavy shafting run the whole length of the building from this pulley and at regular intervals pass through wooden hoods, enclosing the hoisting apparatus connected with the pits below. These hoods stand on truck rollers, which enables them readily to be withdrawn so as to to expose the machinery for repair. By means of clutch-coupling and sleeve on the shafts, the weighers below can throw any pulley on the line out of gear when not required for use. There are also finger couplings for taking the strain of the expansion of the shaftings by heat, and ingenious arrangements by which the shafting can be elevated or lowered at points as needed. to keep the line perfectly even.

On the floor below the weighing is done by 14 sets of Howe scales, with a capacity of 1,500 pounds each, on the platforms of which are bins receiving the grain directly from the floor above. Movable spouts convey the grain to the shipping bins, 78 in number, or to the storage bins in the centre, numbering 174 with a capacity each of from 500 to 9,000 bushels.

The engine room is 28x35 feet, two stories, wainscoted with oak and with an oak floor two inches thick. The power is obtained from two Wright engines of 150-horse power each, resting upon piers of masonry 24x7 feet, and 14 feet high. The boiler room contains four boilers set in massive brickwork. A patent furnace is used, in which the grates are about half the usual size, with a double door securing the heating of the air before reaching the boiler. Waste hot air at the sides is taken up and forced by an injector between the boilers. By these means 270 horse power can be obtained. The elevator is supplied with an excellent system of fire escapes, electric bells and elevators for carrying messages.

The present export movement of wheat is nearly double that of the corresponding time last year. It is doubtful if this rate of exports can be maintained long, as the foreign markets for grain are steadily declining, while the American markets have reached so low a figure as to cause a holding back of grain by our farmers,

FLOURING MILL AND ELEVATOR HAZARDS.

The hazard of flouring mills and grain elevators has been pretty effectually demonstrated in the last few months, during which the loss to insurance has scored an enormous sum. We have taken the trouble to look up the record for the three months, June, July and August, and we find that during that period 36 flouring, 21 grist mills and 12 grain elevators have been burned in the United States and Canada. The loss to insurance, on the former alone, for July and August, aggregate about $800,000, and for the three months an even million dollars. The loss on elevators has been about $600,000 for the entire period named, and the loss on grist mills probably half the latter amount, at least, making an aggregate loss of nearly $2,000,000 to the insurance companies. This month has started in well in the same destructive line, and just how profitable these risks are, present rates considered, ought now to be pretty well demonstrated by actual results.—*The Investigator*.

DOES WHEAT LOSE WEIGHT?

This question is asked and answered by the Kansas City *Live-Stock Indicator*, as follows: "With so much wheat in hand many farmers will be discussing in their minds whether it is better to hold or sell, and one of the questions in that connection will very properly be whether there is likely to be any considerable shrinkage of weight by loss of moisture. There appears to have been but few authenticated experiments to test the matter, and the only ones that come to mind now are those of Prof. Shelton at the Kansas Agricultural College. In the fall of 1879 he prepared a long sack which was filled with exactly 200 pounds of wheat and sunk it deeply into a bin containing 150 bushels of winter wheat. It remained there exactly 6 months when it was taken up and again weighed and pulled down a slight fraction over 200½ pounds. In November, 1880, a similar long sack was sunk in a bin of grain and left there 7 months and a day, when it was taken up and weighed a full 201 pounds of grain. Prof. Shelton says: "This seems to show that wheat does not shrink in the bin, but I am not going to offer an explanation of this increased weight of a half-pound in one case and one pound in the other. This fact becomes all the more remarkable, when we consider that our Kansas winters are among the driest seasons found anywhere. These experiments do seem to show that wheat does not shrink from evaporation in the bin when put up perfectly dry. The loss of weight from wintering over wheat of which I have heard farmers complain, must then, in justice, be charged up to the rats and mice, or to the leaky condition of the granary."

GRAIN ELEVATORS.

The introduction of the American system of country grain elevators into Canada, is a subject that has engaged the attention of grain men here for some time past, and the opinion seems to obtain that such a plan would work well in this country and greatly facilitate business. In the working of the above system, the railway company gives the land for the erection of an elevator or elevators, the minimum capacity of each being 20,000 bushels. Each elevator has a licensed warehouseman and an inspector of grain, and sometimes both positions are combined in one, the inspector acting under instructions from the corporate bodies governing the grain trade of the country. It is also made compulsory that all grain pass through the elevator before being shipped. By this means a uniformity of grades is established at interior points, thereby expediting business to a great extent, and it is the opinion of some of our leading grain men that it would amply repay the outlay of capital required for the carrying out of such a scheme. It is stated that the Canada Pacific Railway Company intend to adopt this system at its principal grain-shipping stations. Its advantages over the present system are many, and its advocates believe that it will soon be introduced by all the railroads of Canada. It affords producers fair play by grading the grain, and thus insuring its being sold upon its merits, while on the other hand it facilitates the transaction of business, as orders for certain grades of grain can then be filled in the country with much greater satisfaction to the purchaser a regular warehouse certificate of the grain shipped being a guarantee of quality.—*Montreal Gazette*.

The American Elevator
—AND—
GRAIN TRADE.

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HARLEY B. MITCHELL, Editor.

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ADVERTISING.

This paper has a large circulation among the elevator men and grain dealers of the country, and is the best medium in the United States for reaching this trade. Advertising rates made known upon application.

CORRESPONDENCE.

We solicit correspondence upon all topics of interest connected with the handling of grain or cognate subjects.

OUR SURPLUS WHEAT.

In the absence of positive returns the estimates of the present crop of wheat, and the amount likely to be exported, are variable quantities. An unofficial but quite reliable authority in our city estimates this season's crop of the eleven surplus producing States of the west at 356,500,000 bushels. Adding to the amount produced in the remaining states, in the favorable year 1880, fifteen per cent. this year's crop would in round numbers amount to about 525,500,000 bushels. As perhaps somewhat exaggerated accounts have gone abroad in regard to this amount, as well as of the amount of wheat America will be necessitated to export, which have been used, according to British custom and interests, to depress the prices in foreign markets, it may be well to study the probabilities somewhat carefully.

From the reports of the National Bureau of Agriculture and Statistics we obtain the totals of the production of the two seasons ended July, 1881, and of the number of bushels exported—flour being computed at 4½ bushels per barrel—of these products. Comparing these accounts gives us an annual average of production of 439,500,000 bushels, of which the average yearly export was 154,150,000 bushels. Placing this year's crop at the ample estimate of 550,000,000 bushels, and using the same rates as in the above averages, there would be an exportable surplus of 264,740,000 bushels from this year's yield. It will be found on examination, however, that the ratio of exports to the production of 1881, owing to high prices and the poor crops of the latter season, was much larger than that of the preceding year. Had the same proportion obtained there would have been 53,900,000 bushels less exported of the crop of 1880–1, which amount must have been taken from reserves previously accumulated, an increase of population of several million will also add to the probable home consumption, at 4½ bushels per capita, about 16,000,000 bushels. To meet this demand and restore our reserves to their former position would diminish our available surplus for exportation to about 195,000,000 bushels. It seems clear then that while our farmers and grain dealers will be able to supply foreign demands at fair rates, in case of great depression in the foreign markets they will be able to take care of any surplus remaining.

THE PATENT DUMP SUITS.

To the owners of elevators and warehouses throughout the country, few questions are just now so interesting as "who was the real inventor of the patent dump?" and "who, if any one, has a rightful claim for royalty for its use?" An allusion in our columns to the claims made for royalties by different parties has called out considerable correspondence, which is presented elsewhere in this issue. Two of the letters ask for information, and another from Messrs. Burnet & Burnet, of Cincinnati, solicitors for the owners of the Swickard patent, gives some facts in regard to the litigation that has taken place and is going on between the owners of the various conflicting patents.

Mr. James M. Harper, of El Paso, Ill., who controls the first four patents, issued on Dumping Apparatus, has submitted to us copies of these patents, with specifications and claims. The first of them is the patent of Noah Swickard, of Galena, Ill., issued Oct. 13, 1868, and reissued Dec. 20, 1870; the second is that of Samuel C. Kenaga, of Kankakee, Ill., issued Oct. 20, 1868; the third is that of Benj. Walton, of Fairbury, Ill., issued Nov. 23, 1869, and the fourth that of Wm. H. Hall, of Bloomington, Ill., issued Sept. 6, 1870.

Mr. Harper is convinced that the patents which he controls are foundation patents, and cover every feature of value in a grain dump. He says that he only wants grain men to investigate the whole subject, as he is confident that they will see the justice of the claims made under the Swickard patent. For our part we have no desire whatever to antagonize legitimate claims made under valid patents. We were misinformed as to the date of the Sypes patent, as we have since learned, it being issued only eleven, instead of seventeen years ago, three years later than the Swickard.

THE DETROIT "CORNER" RULE.

The Board of Trade of Detroit at a meeting called August 15, appointed a special committee to examine the practices of other commercial boards and with the advice of able counsel prepare a rule for the purpose of suppressing, as far as practicable, grain "corners." The action of the Board has not transpired, but the new rule reported is as follows:

THE NEW RULE

Cash Grain at	1 shipping value	2 milling value	deduct freight and insurance.	net value.
New York.....1				
Baltimore.....1				
Phildelphia.....1				
Montreal.....1				
Oswego.....2				
Buffalo.....2				
Detroit.....2				

Average of above—value in Detroit.

"Should the Secretary or Committee be satisfied that one or more of such markets is unnaturally inflated or depressed from any cause whatever, or should it be found impossible to get a quotation from any market or markets, then such market or markets shall be left out of the calculation, and an average of the remaining markets taken. Quotations to be obtained from the secretaries of the Associations on the several markets, or from other reliable sources.

The rule also provides that to the price ascertained as above, the committee on defaults may add five per cent. at their discretion on examination of the course pursued by defaulting sellers. The committee in their investigations, found that it was generally considered that recklessness or neglect on the part of sellers aggravated these disturbances, in consideration of which the Toledo Board had added in all cases the penalty of five per. cent to the settling price; while the St. Louis Board left it optional with the special committee on defaults to add to the price to this limit. The general principle was found to exist in the rules on defaults of all commercial bodies, that a contract can only be fulfilled, as expressed on its face, by the transfer of actual property, and that those who create a condition of the market that prevents innocent dealers from fulfilling their engagements, ought not to be benefitted by the condition so produced.

THE JULY WHEAT DEAL.

On Saturday, October 7, Judge Gardner, of this county, rendered his decision on the cases brought before him in consequence of the "July wheat deal." At that period the No. 2 spring wheat in the market was very largely oversold, and on the last of July a number of the bears had defaulted to an aggregate of about 4,000,000 bushels. A committee of the Board of Trade, after devoting most of the month of August to the examination, found that the settling price should be that of wheat in the open market on the last day of July, $1.35. The bears refused to settle at that price, and asked for an injunction restraining the Board from any act of discipline. A temporary injunction was served for the purpose of hearing the case, which some ten days after the argument, was decided, as above stated, adversely to the complainants.

This was a suit in equity presenting for cause the statements of complainants as to the value of their memberships of the Board of Trade, in business profits, and as a matter of livelihood. They had sold on their own account, and for others, large quantities of No. 2 spring wheat to be delivered in July, the purchasers of which were mainly the agents of Armour and Kershaw, who at the same time were said to be engaged in cornering the market by making purchases largely in excess of its possibilities. The result was the complainants could not obtain the wheat. They also declared that the rule of the Board is not just, as by the controlling interest of the above named parties the price fixed, $1.35, was unjust and excessive, and the damages of expulsion from Board membership would on like grounds, under such influences, be equally unjust. The case was argued by citation of numerous cases in other States and in England. The decision of the court did not touch the merits of the objections to the action of the Board made or premeditated, but by reference to precedents, especially to the case of Sturges vs. Board of Trade, 86 Ill., 441, held that the laws of chancery had no jurisdiction in such cases. In the case of Sturges essentially the same causes for injunction were presented, strengthened by the fact that the proceedings therein for expulsion had already reached the point of balloting in the Board, while no action of that nature has as yet been undertaken in the present case. The former case was appealed to the Supreme Court of the State, and the decision of the Court below sustained. This case has also been appealed.

RAILROADS AND THE FARMER.

The indebtedness of the farmer to the railroad, in greatly and rapidly increasing the value of his agricultural products and of his land, is very apt to be overlooked by the former amidst the hue and cry against "Railway monopolies," and the intensity of present competition. Mr. Edward Atkinson has brought out a large number of specific facts on the relations between these two great parties worthy of consideration by our farmers, as well as by our people generally. During the twenty years preceding 1870 the value of the farms in the twenty-three westernmost counties of New York was more than doubled. This is true also of farm implements and machinery, while the orchard products during the same period were increased in value ninefold. Dairy products rose in value from about $2,500,000 to nearly $20,000,000. In 1880 more wheat was produced than in 1840, also nearly three times as much corn, and two and a half times as much oats and barley. With the westward flow of immigration thousands of acres of land are devoted to small fruits and garden products rendered marketable by railroads. Since the building of the latter the price of land in Oregon has risen from $5 and $10 to from $10 to $100 per acre, and the export of wheat from zero to 5,000,000 bushels. In this State and the adjoining territories the railroads, in operation and in prospect, have added from 100 to 300 per cent. to the value of farm lands, and more than that to the coal fields of Washington Territory.

The railway land grant system of alternate sections is favorable to the farmer by enabling him to obtain from Government lands of equal value to any other, and measurably preventing the consolidation of ownership, and the system of bonanza farming so injurious to social life and individual development.

The States in the great Mississippi Valley have been equally benefitted. Farmers can in large numbers remember the days of endless teaming to a market of 42 cents a bushel for wheat. At the opening of the rebellion Missouri had 600 miles of railroads, and an assessed value of real estate of less than $250,000,000, now it is assessed at more than $400,000,000. Perhaps no one business has been so largely increased in value by railroads as that of the raising of live stock. The supplies furnished to the east and foreign markets is immense and rapidly increasing, while its mode of shipment is taking those farms which add to the industries of the west and the value of its traffic. In the midst of present expense and burdens it is easy for human nature to forget the benefits of the past. The railway once built is there to stay, as well as its advantages. These latter are too often overlooked, and promises so readily made before the advantages were realized are often repudiated for causes neither well conceived or just. "Without our railroad system the agricultural development of this country would be an impossibility, and its commercial prosperity would vanish into thin air."

Commissioner Baker of Minnesota seems to dread the Minneapolis Millers' Association, as a power that may prove a monopoly in the grain trade of the Northwest. He says: "If we are correctly informed, nearly, or quite all of the vast system ef elevators along the Manitoba and Northern Pacific lines, and their railway feeders have been bought and are now owned and controlled by these parties. One purchase after another has been made till they have absorbed them all. Where none existed they are now building. Practically the miller's association have got control of the elevators, which are the great instrumentalities for handling and shipping the grain of the country. The millers' association to-day own and control more than 150 of these elevators in the best wheat regions of the Northwest, and are rapidly building more. The system is gigantic and far-reaching. It is buying the independent elevators and crushing out all competition. It is laying its powerful hand upon every bushel of wheat to be grown in the Northwest. In that they afford facilities for storing and shipping grain they are a blessing. It is the inevitable abuse which follows power in great corporations, which is to be dreaded."

The decisions of state courts in regard to option sales are becoming tolerably numerous. In fact the precedents are becoming confusing from their numbers. We publish a digest of a recent decision of the Supreme Court of Wisconsin among our Legal Notes in this issue.

Editorial Mention.

Many of the July "shorts" in this market have weakened and settled.

Send us particulars of new elevators going up in your vicinity, or changes being made in old ones.

The largest elevator in the world is to be built at South Chicago. It will have a capacity of 3,000,000 bushels.

The exaggerated reports of the probable surplus of our wheat crop has pulled prices down on the continent of Europe.

Memberships in the Chicago Board of Trade have been increased to $10,000 each. A few years ago they could be bought for from three hundred to a thousand dollars.

It will be observed that Mr. Jas. M. Harper, of El Paso, Ill., who controls the Swickard patent on grain dumps, makes an announcement to elevator men, in our advertising columns.

One-half of the "round elevator" patent is soon to be offered for sale, owing to the failure of the half-owner, Mr. Williams. We do not know whether the other half will be sold or not.

Mr. E. M. Sanford, of East Dubuque, Ill., manufacturer of the Novelty Warehouse and Receiving Separator, and other well-known machines used in elevators and flour mills, made us a call a few days since and reported business brisk.

A barge line on the Missouri River is again talked of. Such a line might pay at certain seasons of the year, between Kansas City and St. Louis, but most of the time that old nightmare of a river is too low for barges, or for decent people to notice.

An English paper recently said: "It takes ten days to unload a shipload of grain here that is loaded in less than a day by machinery in the United States; and we suggest that some go-ahead Chicago man come and teach the sons of Albion how to handle grain."

R. W. Dunham, President of the Chicago Board of Trade, has been nominated for Congress by the Republicans of the First District of the State of Illinois (Chicago, south side), and as that party has a majority of 4,000 or 5,000 in the district, will, without doubt, have a seat in the next Congress.

We wish to call attention to the advertisement, in this issue, of the Nordyke & Marmon Co., of Indianapolis, Ind., one of the largest elevator and mill building firms in the country. They have an establishment covering twelve acres of ground, and can furnish anything and everything in the mill or elevator line.

A paper published at Buenos Ayres, Argentine Republic,says that a grain elevator and better shipping facilities at that port would put the Republic in a position to compete with any country in the world in the production of cereals. The pampas of the Argentine Confederation are no doubt among the most fertile in creation, but Buenos Ayres is hardly the port to become a great grain mart. Large and metropolitan as the city is, the harbor is becoming utterly and completely blocked up. The elevator would have to be further down the Plata.

Parties who want an engine specially adapted to elevators should correspond with Messrs. Skinner & Wood, of Erie, Pa. This firm's make of engine has had a great run with elevator men, particularly in the West. A few of the places where they are in use are given in the large advertisement of this firm elsewhere in this paper.

The Supreme Court of Iowa has followed upon the footsteps of the Supreme Court of Wisconsin in a decision upon option dealing. Notwithstanding the decision against option dealing, men *will* speculate, and ought to keep their contracts. The desire to speculate in future prices is almost universal in mankind, and State courts cannot well stop it.

An investigation by proper authorities seems to establish the justness of the charges by shippers in regard to short weights at St. Louis. It is said it was the result of carelessness, and not of intentional dishonesty, as numerous cases have been discovered where shippers had overweights credited to them. The talk has certainly injured St. Louis considerably.

We continue to receive scores of complimentary letters. As a specimen, Mr. Robert S. Nelson, of Harvel, Ill., writes us: "Enclosed find one year's subscription. I liked the sample copy you sent. Your paper is full of valuable information and should be in the hands of all well posted grain men." We shall keep on trying to make the paper better and better.

Messrs. Thornburgh & Glessner, of this city, have issued a very neat circular to the trade, announcing that they have on hand a complete stock of elevator buckets of all sizes, and can fill all orders promptly. This enterprising firm has also put in an additional nut tapper, which increases the capacity of their bolt department to 15,000 Corrugated Belt Bolts per day.

Grain men throughout the country are not likely to be taken in by any of the many roseate schemes for making money by combination pools and the like, the prospectuses of which are so freely scattered through the country; but they ought to caution farmers and everybody else against the swindling concerns, and against the disreputable papers which bolster and puff up such schemes.

INDIAN WHEAT.

The admission is made by the English press that two-thirds of the grain supply of that country must come from abroad. After Germany and Russia the United States must be looked to for this deficiency, "for in ordinary seasons Calcutta, with an extra 3,000 miles of ocean freight, and canal dues of ten francs per ton measurement, cannot well hope to compete with Chicago in supplying breadstuffs to Great Britain." India's annual product of wheat is said to be over 40,000,000 quarters, and her shipments during the year ended March 31, were nearly 20,000,000 hundred weight, valued at about $40,000,000, more than two and a half times the amount exported the preceding year. Light crops and the practices of "grain speculators in America" are among the causes assigned.

It is well for us to appreciate the growing importance of India as a competitor in furnishing wheat to the world's markets. It is stated by a resident, that the Punjab, at a low estimate, produces about 6,000,000,000 pounds of wheat annually, one-fourth of which is available for export, while its capacity for increase by means of irrigation is enormous. In the

Punjab district last year 1,408,068 acres of land were reclaimed by the Government for cultivation. A track between Moritan and Lahore on the "Bar" contains about 2,000,000 acres of rich soil which can readily be made productive by irrigation from the great river system. The vast desert track called "Put," treeless and almost without herbage, presents 2,000 square miles of soil that can be rendered productive by irrigation from the Nari River. Though these facts may not seem to present immediate dangers to our grain trade they teach the lesson that the more largely our exports are of concentrated values in manufactured articles, and the less dependent upon the original products of the soil, the better and surer will be our position in competing for the world's trade.

AN ASSOCIATION OF ELEVATOR MEN.

A number of grain dealers in this State have formed an association for testing the validity of the Patent Dump Claims. The intention, we are informed, is to defend any suit commenced against one of the members of the association and make a test case of it. It is expected that the association will represent from three to five hundred elevators, and represent about a thousand dumps. C. W. Johnson, of Kankakee, Ill., is the secretary.

THE article on grain bins, by Mr. Isaac Roberts, which appears in this issue, is controverted by a well-known firm of engineers, Messrs. Higginbottom & Stuart, of Liverpool, Eng., who write to the *Engineer* that they believe the safest way to decide upon the strength requisite for the sides and bottoms of grain hoppers is to treat grain as a fluid and not as a static mass, as is done by Mr. Roberts.

NEITHER of the two great parties in New York State has espoused the cause of free canals with very much zeal. If the friends of the movement do not stir themselves on election day, the amendment to the state constitution providing for free canals will in all probability be beaten. However, it is expected that New York City will cast a very large vote in favor of free canals, as she ought, considering that she has a vital interest in carrying the measure.

THE FARMS OF THE UNITED STATES.

The following table shows the number of farms in the United States, how many are occupied by the owners, how many rented for cash and the number rented for shares of the produce:

STATES.	Occupied by Owner.	Rented for fixed money rental.	Rented for shares of produce.
Alabama	72,215	22,888	40,761
Arkansas	65,245	9,916	19,272
California	28,810	3,209	3,915
Connecticut	27,472	1,920	1,206
Dakota	16,757	72	606
Delaware	5,041	511	3,197
Florida	16,198	8,548	3,692
Georgia	76,451	18,557	43,618
Illinois	175,497	20,620	49,624
Indiana	147,963	8,582	37,468
Iowa	141,177	8,421	35,753
Kansas	115,910	4,438	18,213
Kentucky	122,426	16,824	27,203
Louisiana	31,286	6,669	10,337
Maine	61,528	1,628	1,153
Maryland	27,978	3,878	8,661
Michigan	138,597	5,015	10,396
Minnesota	83,933	1,251	7,292
Mississippi	57,214	17,440	27,118
Missouri	156,703	19,843	39,029
Nebraska	51,963	1,948	9,476
New Hampshire	29,566	1,237	1,378
New Jersey	25,869	3,708	4,830
New Mexico	4,645	22	386
New York	201,186	18,124	21,748
North Carolina	104,887	8,644	44,078
Ohio	199,562	14,834	32,793
Oregon	13,938	741	1,538
Pennsylvania	168,220	17,049	28,273
Rhode Island	4,980	989	247
South Carolina	46,645	21,974	25,245
Utah Territory	9,019	60	373
Vermont	30,760	2,164	2,598
Virginia	83,531	13,392	21,594
Washington	6,058	209	262
West Virginia	50,673	4,292	7,709
Wisconsin	122,163	3,719	8,440

In 1850 Indiana had but 93,896 farms, Illinois had 76,208, and Ohio 143,807. This table shows how greatly the number of farms have increased in thirty years.

Communicated.

An Inquiry.

Editor American Elevator and Grain Trade:—We notice in your journal for August an article in regard to that patent dump. Nearly or about all the elevator men in this section have bought and are using the Sypes right. Some months ago a party made calls around here, and collected, and attempted to collect for the McGrath right. Now comes another party with an additional claim—the Swickard patent, we think. We are told that suits are pending. We thought that probably we could learn something through your paper. We have not got the dates when the patents were obtained, but think it was in 1870. A party in this place has settled by paying $100 for the right. Who, in the first place, obtained the right of Sypes'?

Yours truly,
INQUIRER.

Lacon, Ill.

The Patent Dump Suits.

Editor American Elevator and Grain Trade:—Referring to your article in the August number of your paper, entitled "That Patent Dump," and the letter from Mr. McGowan in the September issue, we would say that we are one of the parties from whom a royalty is asked. Before paying this we want all the information on the subject that we can obtain. While we are aware that there are a number of patents out, yet if the dump referred to by Mr. McGowan was put in in 1866 we do not see how these patents can hold good. The following patents have been issued: One to Noah Swickard, No. 83,005, re-issued December 20 ,1370; S. C. Kenaga, October 20, 1868; B. Walton, December 23, 1869; W. M. Hall September 6, 1870; R. M. McGrath, June 6, 1871. We trust that elevator men, readers of the AMERICAN ELEVATOR AND GRAIN TRADE, will investigate this dump matter, and make known their investigations.

Yours truly,
A SUBSCRIBER.

The Swickard Dump Patent.

Editor American Elevator and Grain Trade:—We notice in a recent issue of your paper a cautionary article entitled "That Patent Dump," in which you "advise all elevator men to beware of the patent right dump shark as he is collecting without process of law;" and that "the only dump of any account is now seventeen years old, etc.," alluding, we suppose, to the "Sypes patent," as Mr. John Sypes died last winter in Chicago of the small-pox. The patent to Mr. Sypes was issued October 10th, 1871, and is therefore but eleven years old, with six years yet to run, but prior to the Sypes patent, or to his invention, a patent was issued October 13, 1868, No. 83,005, to Noah Swickard, for a "wagon and car unloader," which is substantially the same device as the Sypes invention, dumping the wagon in precisely the same manner. The Swickard patent has three full years yet to run, and in our opinion is a valid patent, and is infringed by all elevator men using grain dumps who have not obtained license from the owners of the Swickard patent. The McGrath patent has been pushed quite vigorously of late, and agents representing McGrath have been collecting license fees to a large amount. The McGrath patent was issued in 1871 for the same device as the Sypes and the Swickard, but in an "interference case" in the U. S. Patent Office, "Sypes vs. McGrath" was vacated. Suit has been instituted in the U. S. Circuit Court at Indianapolis by the owners of the Swickard patent to have the McGrath patent declared invalid and an infringement upon the Swickard. Several decrees have been obtained on the Swickard patent in the United States Circuit Courts, and suits are now pending in Indiana, Illinois, and Iowa on this patent against parties who have refused to settle with the owners for infringements of their rights. We deem it but just to inform you of the facts that your readers may not be misled to resist the rightful claims of the owners of the Swickard patent. It is but just also to the owners of the Swickard patent that they should be set right.

Respectfully,
BURNET & BURNET,
Solicitors for owners of the Swickard patent.
Cincinnati, Oct. 8.

GRAIN INSPECTION AT CHICAGO.

With the increase of business in the Chicago grain market years ago, the importance of uniformity and correctness in grain inspection became more and more obvious. Previous to 1858 every dealer was a law unto himself, and the reputed grades of wheat in market were liable to be either a farce or a fraud. In the year mentioned the Chicago Board of Trade, not then a large body, undertook to regulate and improve the system of inspection by appointing inspectors and paying them salaries. The results were far from satisfactory. The inspectors were appointed and paid by these who were the largest grain receivers and whose interests they naturally consulted with small regard for the general welfare of trade. There was a constant variability of standards at intervals longer or shorter down to days and hours. Changes of rules occurred of which notices were given of only forty-eight—and even of as short a time as twelve hours. Business suffered severely. Warehouses were filled with grain unfit for handling, causing heavy losses. Matters became so bad that in 1868 "the chief inspector was required to thoroughly examine the contents of every warehouse and post the condition in each, *daily*, on 'Change." At length the business public, aided by the fair dealing, members of the Board, united to devise a method of relief, and in 1871, by legislative action the inspection and warehouse business was placed under the authority of the State.

The present Board of Trade in this city consists of 1,800 members, one-third of whom are engaged in legitimate trade; a small number of the remainder are not in active business, while the rest are the representatives of speculative capital, whose business lies in "margins," who have little friendship for a steady, healthy market, because their interests lie in uncertainties and fluctuations. They are, as occasion serves, either "bulls" or "bears." It is easy to judge the fitness of a body so constituted to control the general interests of the grain trade.

Since the change above stated in inspectorship control, at each session, the Legislature is urged to reconsider its action and replace this control in the hands of the Board of Trade. Errors of inspection are discovered and magnified, some of them inseparable from the service. But the great point made, just now falling in with the general demand for reform in our civil service, is that the appointments are political and per necessity corrupt. The facts in the case are that the Chicago grain inspection has no equal in the grain markets of the world for the reliability of its grades. For the past five years not a single warehouse receipt has been posted on account of grain being damaged in store. The chief inspector is appointed by the Governor. He, however, fully appreciates his responsibility to the public and its interests. The service is rendered by experts not dischargable without good cause. The first and second assistant inspectors and several of the third assistants have held their positions continuously for from seven to nineteen years. Assuredly there is no cause for alarm or reason for change. We do not believe that the legitimate dealers on the Board desire a change, and feel assured that the animus of those that do needs only to be understood to insure the utter defeat of their plans.

MEXICAN WHEAT.

The *Two Republics*, published in the city of Mexico, says of wheat in that country: The fact that American exporters are looking towards Mexico for wheat for exportation from the southern ports of the United States should be of interest to our readers who reside in the northern part of Mexico. If there is any one product for which the soil of the States of Nuevo Leon, Coahuila, Durango, Chiluahua Sinaloa is peculiarly adapted, that product is most assuredly wheat, the state of Coahuila in particular having long been renowned for the superiority of its flour. Whether the wheat grown in Mexico will pass out of the country across the Rio Grande, or through the port of Tampico remains to be seen, but it is probable that the Huntington-Frisbie road, which is to pass through the state of Coahuila, and which will connect at Eagle Pass, Texas, with the Southern Pacific Railway system of the United States, will carry out of the country large quantities of this grain, in which case it will be shipped from New Orleans to Europe. In any event, however, it should be encouraging to Mexican farmers to know that, as regards time and distance, the wheat raised in the northern sections of the Republic will have a considerable advantage over that grown in California.

General Items.

The province of Buenos Ayres is shipping Indian corn to Bordeaux, Havre, Marseilles and Liverpool.

Oats are still to a considerable extent the bread-grain of Scotland, though not nearly so much used as formerly.

With a crop of between 500,000,000 and 600,000,000 bushels of wheat, 6,000,000 bales of cotton, and over 1,500,000,000 bushels of corn, railway prospects are bright.

Five bags of corn were shipped from Waco to St. Louis as a sample of the quality of corn soon to be shipped in car-load lots. The corn was put up at auction on 'Change and sold at $6.75 per bushel.

The corn crop for the State of Georgia is estimated by the State agricultural department to be in the neighborhood of 30,000,000 bushels, which makes the yield about equal to that of 1859, which latter has long been regarded as probably the largest corn crop ever gathered in the State.

The building used as an elevator and warehouse by Jacob Williams, at Freeport, Ill., was totally destroyed by fire on the evening of September 29. The loss was between $4,000 and $5,000, with insurance to the amount of $2,500. The cause of the fire is unknown, but supposed to have originated in the boiler room.

The troubles in Ireland seem to have had no perceptible effect on its agricultural progress. Last year there was an increase in the area under crops of 114,000 acres as compared with 1880. Ireland is really a pastoral country. One-half the area of the island is under grass, bog and waste cover nearly one-quarter the total area, while the tillage is not more than one-third of the whole acreage.

The San Francisco *Journal of Commerce* presents a statement compiled from "hundreds of sources," showing the wheat crop of the present year. The total acreage, it says, is 3,249,030, and the total yield 29,590,500 centals. This is equal to 49,317,500, or almost 50,000,000. It is the greatest crop ever raised in the State outside of 1880. The surplus for export is about 22,690,000 centals, or 1,134,500 tons.

Surgeons know the value of the expansive power of peas and other grain in making anatomical preparations. No one has any idea of the force exerted until a test of it is made. An Italian vessel, laden with rice, put into East London some time ago, leaking badly. A strenuous effort was made to pump out the water and unload the cargo, but the rice continued to swell, and finally the vessel was violently burst asunder.

The average receipts of grains of all kinds in Chicago approximate 400,000 bushels daily, Take it the year through, between 40,000 and 45,000 bushels of wheat and between 220,000 and 240,000 bushels of corn are unloaded at the city elevators. Reduced to wheat bushels the total receipts of grain for the year 1881 reached 145,000,000 bushels. For the handling of this property receivers and shippers get a commission of one cent a bushel, or $1,450,000 a year.

"Bill Arp" says: "There are some curious things about Indian corn, and one is where do the red ears and the speckled ears come from when you don't plant any but white ears; and another is, why don't we find an ear with an odd number of rows on it? You can find a four-leaf clover, but I have never found the odd row on an ear of corn yet. It is always fourteen or sixteen, or twenty, or some even number, and I would like to understand what corn knows about mathematics, and what objection nature has to odd numbers. But nature is full of mysteries.

The very modest estimates of *Bradstreet's* place the southern wheat harvest at 48,500,000 bushels, beside 16,000,000 bushels for Kentucky and 30,000,000 for Missouri; other estimates are much higher, and no one need be surprised if the South, excluding Kentucky and Missouri, should harvest sixty million bushels of wheat and six hundred million bushels of corn. Missouri is expected to have from 210 to 250 million bushels of corn; Kentucky will have about 110 million bushels; Texas about 125 million bushels; Tennessee about 80 million bushels. This is an enormous increase over all previous years, and a similar increase has taken place in all minor crops, while cotton is expected to be fully as prolific as ever before.

Besides the great corn and wheat crop of Kansas—150,000,000 bushels of corn and 35,000,000 of wheat—according to the latest report of the board of agriculture that state has, among the minor crops this season, 1,900,000 bushels of flax seed, 346,960 bushels of barley, cotton estimated to be worth $50,000, hemp to the value of $30,000, and tobacco estimated worth $40,000. The potato crop is worth $2,300,000, sorghum $2,500,000, broom corn $3,000,000, castor oil beans $750,000, rice corn and millet $735,000. Her total crop is reported worth $138,385,315 as a total.

The Northern Pacific officials are in receipt of information which leads them to give the wheat yield of Minnesota at 15.49 per acre, a total of 39,808,606. Between this and the above a fair mean would be 41,000,000 bushels as the grand total, which would leave 30,000,000 bushels for export, taking 6,000,000 for home consumption and 5,000,000 for seed. The Northern Pacific also claims an average of twenty-five bushels per acre along their line in Dakota, or a grand total of more than 9,500,000. The same source gives a total yield in the counties of Becker, Benton, Clay, Morrison, Otter Tail, Stevens, Todd and Wadena of 5,561,779, an average of eighteen bushels to the acre. The estimate of the yield per acre in the southern counties is on a general average thirteen bushels, and in the Red River tier, on the Manitoba, eighteen to twenty.

This is what Secretary Folger says about free canals: "There can be no question that the artificial waterways of the State should be preserved. They are the means of competition with other bidders for the carrying trade of the country, and must be kept up therefor, not in the hands of private persons or corporations, which are apt to act chiefly for their own benefit, but in the hands of the people, where they can be managed for the public interest to prevent, to protect, and to abate the rigor of private action. The tendency of business affairs nowadays is to the aggregation of capital and to its use in repressing individual or weaker enterprise. It is well, threrefore, that the State with its aggregate power should retain and maintain a means so potent as the canals, of regulating the carrying trade through the State, so that individuals and companies of slender means may enter into competition with those of great power, and enforce as or as may be equal and reasonable facilities of carriage."

Wheat has always been and will in all probability continue to be the staple production of Minnesota. The cultivation of the coarser grains is increasing, as the soil and climate are well adapted to oats and barley, but up to the present only sufficient oats and corn have been produced to supply local consumption and the demands of the Northwestern and Lake Superior trade. Some barley reaches other markets, but the trade in coarse grains is not heavy. The total storage capacity of public elevators, private elevators, and storage in the mills in the city is 3,500,000 bushels. Individual millers and companies of which the millers own a controlling interest have warehouses and elevators at all principal points on the St. Paul, Minneapolis and Manitoba road, also at some points on the Hastings and Dakota Division of the Chicago, Milwaukee & St. Paul, and on the Minneapolis & St. Louis Roads, with storage capacity for 3,000,000. These elevators answer all purposes of storage in the city, as millers can get supplies from them at all times. This gives reliable storage to Minneapolis millers for 6,500,000 bushels of wheat.

WHEAT IN EUROPE.

The following is the latest estimate of the wheat crop of 1882 in the countries of Europe named. It is given in English quarters, eight English bushels being a quarter:

	Quarters.
The home countries	1,301,250
Southern England	1,153,875
Western England and Wales	1,574,625
Northern England	1,235,625
Middle England	2,026,050
Eastern England	3,661,000
Scotland	290,000
Ireland	425,000
Islands	30,000
	11,697,425

It is believed that the British demand on our surplus wheat will be considerably over 100,000,000 bushels; France, 40,000,000; Spain, 10,000,000, and that of Switzerland and the Netherlands about the usual amount.

The wheat crop is believed to be short of an average in Germany and the same is true respecting Russia. European Turkey, Bulgaria and Roumania have average crops. The shipments of wheat from India was 145,709 quarters, against 284,033 for same period last year. This indicates a shortage there also.

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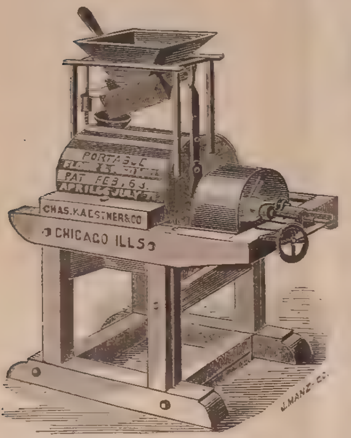

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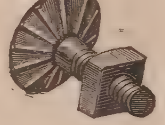

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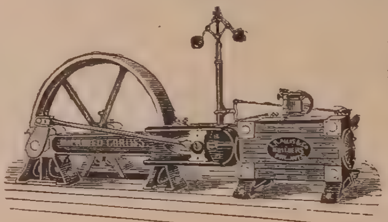

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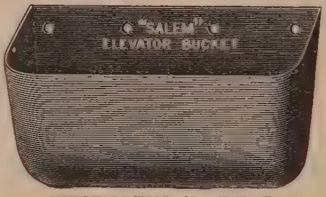

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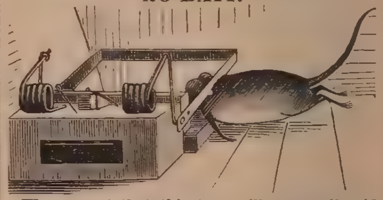

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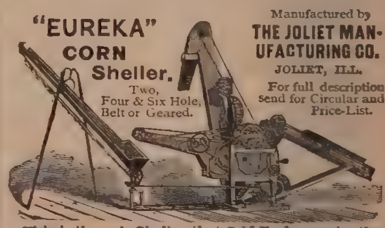

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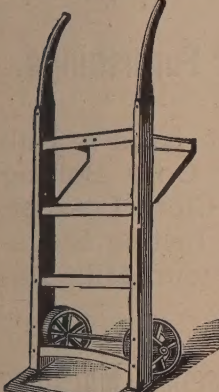

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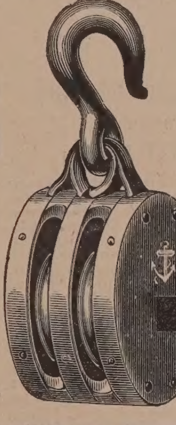

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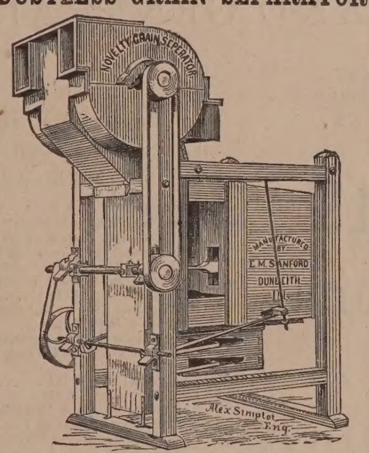

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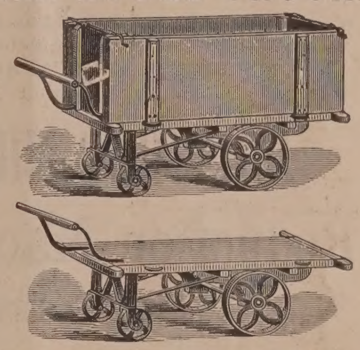

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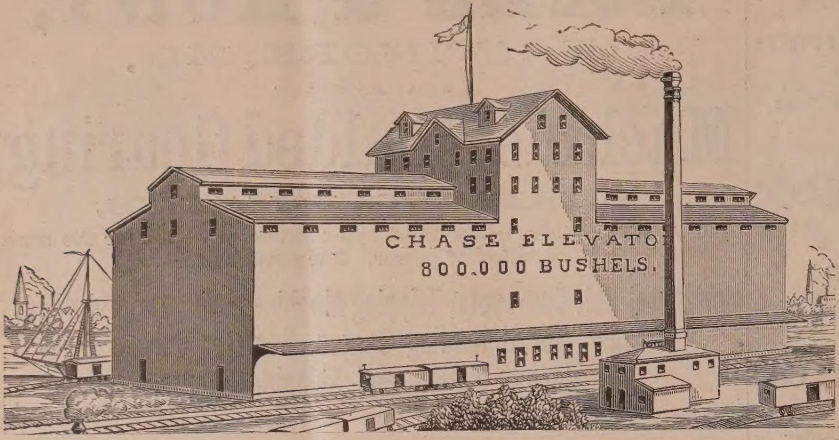

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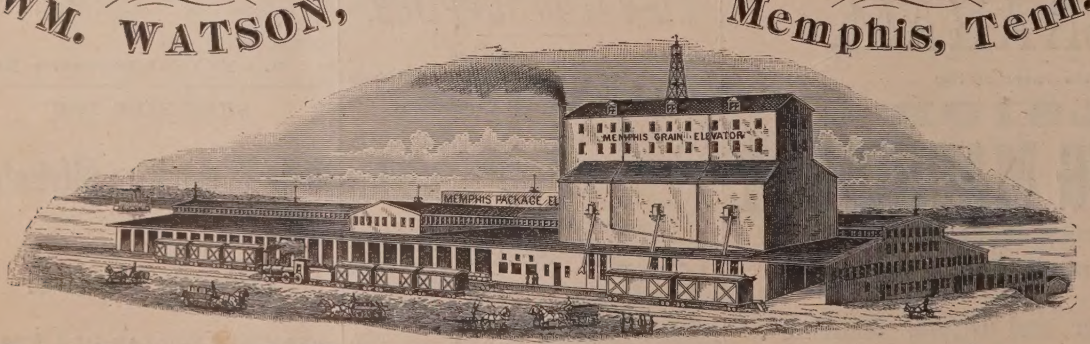

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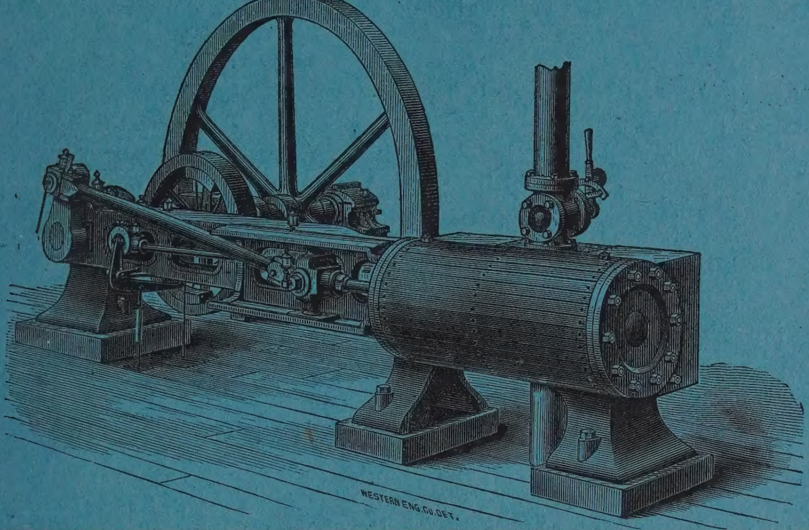
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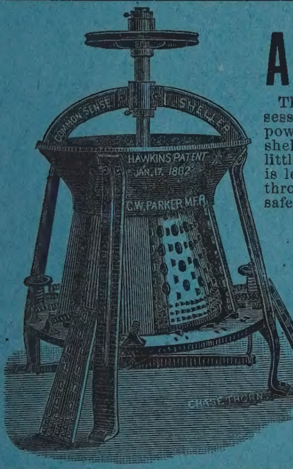

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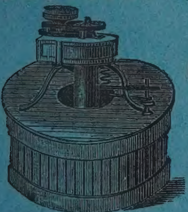

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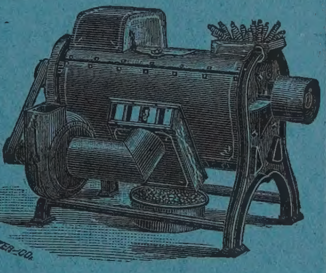

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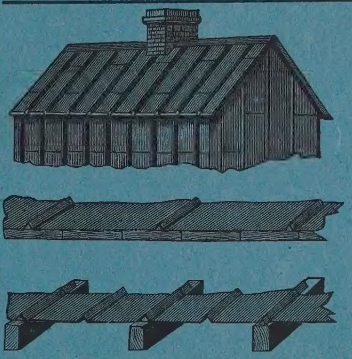

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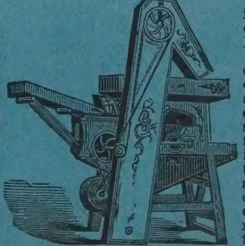

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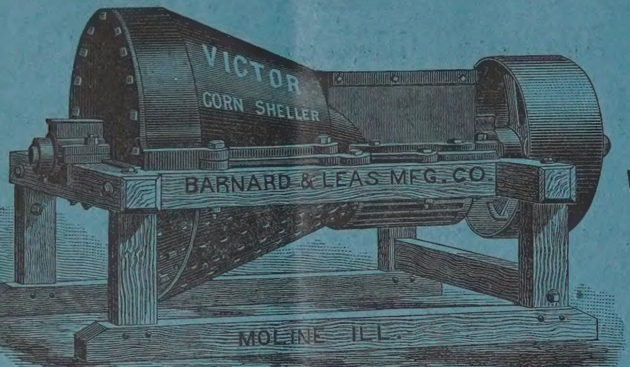
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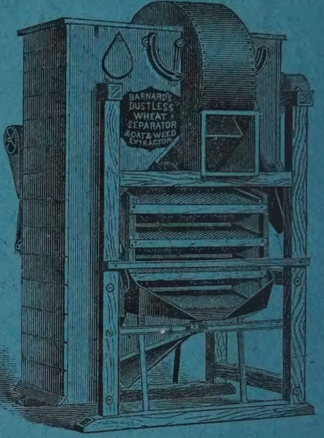

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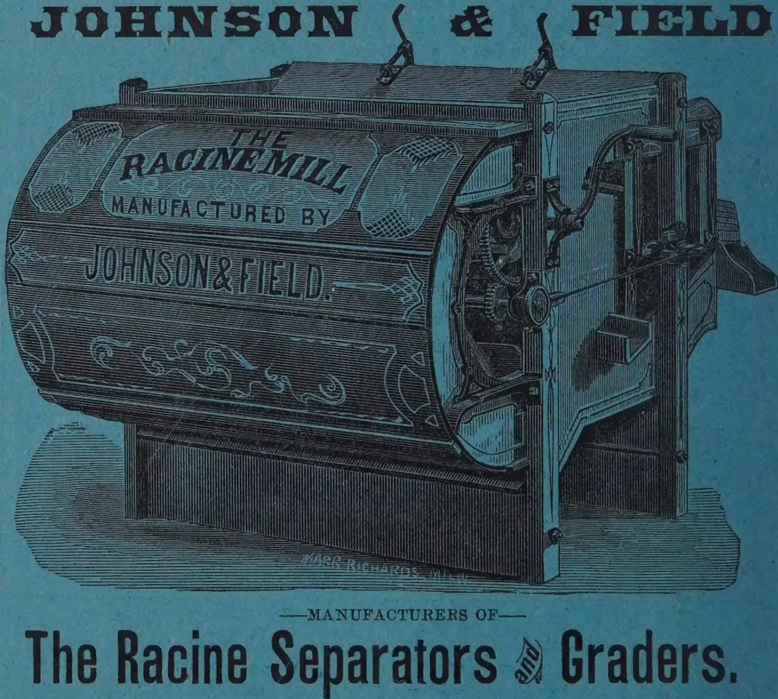

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